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April 5, 1977

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UNITED STATES PATENT and TRADEMARK OFFICE

April 5, 1977 Volume 957 Number 1

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PATENT AND TRADEMARK OFFICE NOTICES

Board of Appeals Decisions Rendered in the Month of February 1977

Affirmed	181
Affirmed in Part	24
Reversed	62
Total	267

Revised Page Numbering Format for Official Gazette

The Patent and Trademark Office has decided to use a separate page number series for the notice section of the OFFICIAL GAZETTE effective with the April 5, 1977 issue. This revised numbering series will result in savings in printing costs to the Office and will also provide complete citation data on each page of the notice section.

Specifically, in the Patents Section of the OFFICIAL GAZETTE, the pages containing the "Patent and Trademark Notices," "Patent Notices" and "Condition of Patent Applications" sections will be numbered consecutively in each volume which cover the period of one month. Each page number of these notice sections will be preceded by the volume number for that month and the capital letters "OG," for example, "957 OG 2." The "Defensive Publications," "Reissue Patents Granted," "Plant Patents Granted," "Patents Granted," and "Design Patents Granted" sections will be separately numbered consecutively throughout each month without any prefix. The patent index sections will continue to be numbered with the "PI" prefix followed by a new series of arabic numerals in each issue.

In the Trademark Section of the OFFICIAL GAZETTE, the pages containing the "Patent and Trademark Notices," "Condition of Trademark Applications," and "Trademark Notices" sections will be numbered consecutively in each volume which cover the period of one month. Each such page in notice portion of the Trademark Section will be preceded by the volume number for that month and the capital letters "TMOG," for example, "957 TMOG 3." The "Marks" section will be separately numbered consecutively each month with the "TM" prefix. The "Index of Registrants" section pages will be indicated by the prefix "TMI" followed by a new series of arabic number series for each issue.

C. MARSHALL DANN,
Mar. 15, 1977. *Commissioner of Patents and Trademarks.*

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

3,154,060, A. Hundere, RECIPROCATING-PISTON GASOLINE ENGINE FUEL-AIR RATIO CONTROL, **filed** June 2, 1970, D.C., W.D. Wash. (Seattle), Doc. 8997, *Alcor Aviation Inc.* v. *Radair Inc. and Uniwest Inc.* Judgment filed in District Court, July 13, 1972, which was appealed. Circuit Court affirmed District Court decision. Circuit Court judgment received on Feb. 20, 1976.

3,395,800, Kraus and Fall, SEWAGE TREATMENT AND APPARATUS THEREFOR, **filed** Oct. 26, 1976, D.C., E.D. Mich. (Detroit), Doc. 76-229, *Ecodyne Construction* v. *Barton-Malow Construction Co.* **Same, filed** Oct. 26, 1976, D.C., E.D. Mich. (Detroit), Doc. 76-72230, *Ecodyne Corporation* v. *A. J. Etkins Construction Co.*

3,451,314, L. F. Smrekar, COLLET MECHANISM, **filed** Nov. 12, 1976, D.C., N.D. Ohio (Cleveland), Doc. C76-1199, *Larry F. Smrekar* v. *The Warner and Swasey Company.*

3,462,026, L. Maccherone, MACHINE FOR AUTOMATICALLY PLACING BAGS ON A WICKET; **Re. 27,523,** same, **filed** Nov. 11, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76-3511-RMT, *Universal Machinery Corp.* v. *FMC Corp.*

3,497,877, Diemond and Greenberg, POOL WITH INTEGRAL SLIDE, **filed** Nov. 10, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76-3502-RJK, *Muskin Corporation* v. *Coleco Industries, Inc.*

3,519,235, L. E. Walter, FOLDING SIGN SUPPORT, **filed** May 20, 1975, D.C. Conn. (Hartford), Doc. H75-165, *Walter Sign Corp.* v. *Continental Products, Inc.* Plaintiff is owner of said patent. Perpetual injunction shall issue out of and under the seal of this court, Mar. 24, 1976.

3,600,799, R. D. Lee, FOOD PATTY PRESS, **filed** Sept. 28, 1973, D.C.N.J. (Camden), Doc. C-1399-73, *Le Mark Industries, Inc.* v. *Edwards Creative Products, Inc.* The complaint and counter-complaint is hereby dismissed without prejudice, Nov. 15. 1976.

3,650,766, Y. Smadar, EXTRUDED FOOD PRODUCTS AND METHOD OF PRODUCING SAME, **filed** Nov. 15, 1976, D.C., E.D. Tenn. (Knoxville), Doc. C-3-76-363, *DCA Food Industries, Inc.* v. *Wintergarden Frozen Foods, Inc.* **Same, filed** Nov. 19, 1976, D.C. Tenn. (Jackson), Doc. C-76-131-E, *DCA Food Industries, Inc.* v. *Wintergarden, Inc.*

3,663,880, A. Gabor, APPARATUS FOR CONTROLLING THE RELATIVE POSITION BETWEEN TWO RELATIVELY MOVABLE MEMBERS; **3,858,509,** W. J. Grundherr, CONTROL LOGIC FOR PRINT WHEEL AND HAMMER OF HIGH SPEED PRINTING APPARATUS, **filed** July 24, 1975, D.C., N.D. Calif. (San Francisco), Doc. C-75-1556-CBR, *Xerox Corporation and Diablo Systems, Inc.* v. *Qume Corporation and Sen Lin Lee (also known as David Lee).* Stipulation of dismissal, Nov. 11, 1976.

3,745,511, D. L. Fussell, MULTICONDUCTOR CABLE CONNECTOR, **filed** Nov. 16, 1976, D.C., S.D. Tex. (Houston), Doc. CA76-H-1901, *Mark Products, Inc.* v. *Geosource Inc.*

3,752,228, R. C. Bosse, I-TYPE SEGMENTED FINNED TUBE; **3,764,774,** same, I-TYPE SEGMENTED FINNED TUBE AND ITS METHOD OF MANUFACTURE, **filed** Nov. 11, 1976, D.C., N.D. Okla. (Tulsa), Doc. 76-C-572-C, *Escoa Fintube Corporation* v. *Tranter, Inc.*

3,760,375, Irwin and Levine, SOURCE DATA ENTRY TERMINAL, **filed** July 22, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c2695, *Sycor, Inc.* v. *International Business Machines Corporation.* Case transferred to U.S.D.C. for the Eastern District of Michigan, Southern Division, Aug. 10, 1976.

3,764,774. (See 3,752,228.)

3,810,282, C. F. Doggett, BURIAL DEVICE AND METHOD FOR USING SAME, **filed** Nov. 12, 1976, D.C., S.D. Iowa (Des Moines), Doc. 76-364-2, *John R. Floren and United Merchandising Corporation* v. *Charles F. Doggett and Hawkeye Machinery Company.*

3,810,631, J. M. Braly, GOLD CLUB HEAD OF THE IRON TYPE HAVING A CONCAVE SOLE, **filed** Nov. 12, 1976, D.C. Del. (Wilmington), Doc. 76-395, *Con-Sole Golf Corporation* v. *Wilson Sporting Goods Company.*

3,815,955, C. A. Gibilterra, CHAIR CONSTRUCTION; **D. 241,487,** same, CHAIR OR THE LIKE, **filed** Nov. 15, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c4210, *Vecta Contract, Inc.* v. *Brad Laycock & Associates, Inc. et al.*

3,829,348, Spiegel and Miller, DECORATIVE THREE-DIMENSIONAL OBJECTS, **filed** Nov. 15, 1976, D.C., E.D. Pa. (Philadelphia), Doc. 76-3555, *Gilbreth International Corporation* v. *F. W. Woolworth Co.*

3,849,728, A. Evans, FIXED POINT PROBE CARD AND AN ASSEMBLY AND REPAIR FIXTURE, **filed** June 1, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76-1751-DWW, *Micro-Probe Incorporated* v. *Wentworth Laboratories, Inc.*

3,854,467, Hofmeister, Nicolin and Barrie, FORCE MULTIPLYING TYPE ARCHERY BOW, **filed** Apr. 25, 1975, D.C. N. Mex. (Albuquerque), Doc. C-75-226, *Herter's Inc.* v. *Groves Archery Corporation.* The plaintiff agreed to dismiss with prejudice all claims of infringement of said patent against the defendant and the case was closed, Mar. 5, 1976.

3,858,509. (See 3,663,880.)

3,867,806, Lancaster and Lancaster III, PROCESS OF MAKING A STRETCHED-WRAPPED PACKAGE, **filed** Sept. 1, 1976, D.C.N.J. (Newark), Doc. C-76-1713, *Lantech Inc.* v. *Packaging Sales and Development Corporation.* Consent judgment for permanent injunction, Nov. 11, 1976.

3,873,076, O. R. Evans, ANNULAR BUMPER GUARD FOR FLOATING VESSELS, **filed** July 26, 1976, D.C., W.D. La. (Shreveport), Doc. CV 760776–L, *Oreco III, Inc.* v. *Regal Tool & Rubber Co., Inc.*

3,876,184, C. N. Eudy, ANCHOR WINCH, **filed** Feb. 18, 1976, D.C., N.D. Miss. (Oxford), Doc. EC76–29 S, *Charles N. Eudy* v. *Motor-Guide, Herschede Hall Clock Co., a division of Arnold Industries, Inc.*

3,928,933, T. Iwamoto, HOLDING TOY, **filed** Sept. 29, 1976, D.C., N.D. Calif. (San Francisco), Doc. C–76–2132 ACW, *ITI Hawaii, Inc. and Takeji Iwamoto* v. *Gems of the Golden West and Jack B. Neuman and Florence C. Neuman.* Judgment on consent decree; defendant had infringed plaintiff's valid patent, defendant enjoined from further restraint after certain time, Nov. 12, 1976.

3,933,025, M. S. Mazman, MUSCLE BUILDING EXERCISE DEVICE, **filed** Nov. 17, 1976, D.C., E.D. Calif. (Fresno), Doc. F–76–211, *Universal Gym Equipment* v. *Martin Mazman and DeWayne Zinkin.*

Re. 27,523. (See 3,462,026.)

Re. 28,419, R. J. Schoerner, METHOD OF FABRICATING ALUMINUM ALLOY ROD, **filed** Nov. 17, 1976, D.C., E.D. La. (New Orleans), Doc. 76–3606, *Southwire Company* v. *Kaiser Aluminum & Chemical Corporation.*

D. 230,668, J. Johnson, BAR STOOL; **D. 230,671,** same, CHAIR, **filed** Nov. 12, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–3540–MML, *Landes Mfg. Co. et al.* v. *Chromodern Chair Co.*

D. 237,758, E. L. Huffman, EYE SHADE WITH REMOVABLE CROWN, **filed** Oct. 28, 1976, D.C., E.D. Calif. (Los Angeles), Doc. CV76–3367LEW, *Erline L. Huffman* v. *Five Star Sporting Goods.*

D. 241,487. (See 3,815,955.)

D. 242,181, M. Davis, LUGGAGE CASE, **filed** Nov. 16, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c4237, *Airway Industries, Inc.* v. *Suh-Won America, Inc.*

PATENT NOTICES

Certificates of Correction for the Week of Apr. 5, 1977

Re. 28,887	3,979,437	3,994,871	4,000,487
Re. 29,108	3,979,839	3,995,042	4,000,543
D. 239,319	3,980,937	3,995,045	4,000,556
3,492,047	3,982,420	3,995,111	4,000,691
3,575,131	3,983,020	3,995,256	4,000,706
3,622,424	3,983,040	3,995,284	4,000,709
3,660,089	3,983,433	3,995,466	4,000,773
3,676,418	3,983,613	3,995,776	4,000,805
3,705,050	3,983,879	3,995,813	4,000,953
3,717,453	3,984,034	3,995,994	4,001,022
3,741,860	3,984,300	3,996,217	4,001,028
3,827,260	3,984,603	3,996,218	4,001,094
3,868,794	3,985,323	3,996,278	4,001,232
3,881,336	3,985,363	3,996,281	4,001,233
3,883,612	3,985,605	3,996,298	4,001,241
3,886,865	3,985,927	3,996,362	4,001,460
3,887,292	3,986,099	3,996,612	4,001,577
3,891,542	3,987,074	3,996,709	4,001,742
3,911,824	3,987,210	3,996,717	4,002,608
3,913,262	3,987,243	3,996,739	4,002,731
3,919,409	3,988,066	3,996,842	4,002,790
3,928,319	3,988,172	3,996,890	4,002,800
3,939,091	3,988,239	3,997,122	4,002,876
3,939,106	3,988,320	3,997,463	4,003,123
3,939,173	3,988,913	3,997,699	4,003,189
3,940,372	3,989,387	3,998,013	4,003,264
3,942,650	3,989,641	3,998,400	4,003,371
3,944,797	3,989,670	3,998,882	4,003,463
3,948,480	3,989,715	3,998,940	4,003,575
3,951,892	3,989,855	3,998,946	4,003,685
3,958,808	3,989,877	3,998,950	4,003,806
3,960,966	3,990,124	3,998,991	4,003,890
3,961,001	3,990,591	3,999,041	4,003,979
3,961,892	3,990,940	3,999,056	4,004,171
3,963,340	3,991,004	3,999,260	4,004,244
3,964,980	3,991,612	3,999,316	4,004,387
3,965,119	3,991,731	3,999,486	4,004,775
3,966,768	3,992,198	3,999,537	4,004,812
3,967,100	3,992,348	3,999,618	4,004,859
3,967,306	3,992,555	3,999,622	4,004,960
3,972,400	3,993,753	3,999,908	4,005,157
3,974,407	3,993,882	3,999,963	4,005,294
3,977,385	3,994,022	3,999,970	4,005,615
3,977,650	3,994,062	4,000,034	4,005,898
3,978,254	3,994,511	4,000,055	4,006,839
3,978,620	3,994,521	4,000,316	
3,978,691	3,994,825	4,000,444	
3,978,933	3,994,837	4,000,486	

Disclaimers

3,792,294.—*James Jerome Royer,* Hanover, Pa. RECTANGULAR AT-CUT CRYSTAL PLATE. Patent dated Feb. 12, 1974. Disclaimer filed Feb. 18, 1977, by the assignee, *Bell Telephone Laboratories, Incorporated.*

Hereby enters this disclaimer to claims 1, 4 and 6 of said patent.

3,889,515.—*Walter J. Grombka,* Tiffin, Ohio. WEDGING STRUCTURE FOR PRESSES OR THE LIKE. Patent dated June 17, 1975. Disclaimer filed Feb. 10, 1977, by the assignee, *The National Machinery Company.*

Hereby enters this disclaimer to claims 1, 2, 4, 5, 6 and 9 of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF FEBRUARY 26, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	7-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	6-22-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	3-18-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	4-22-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	3-1-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	10-15-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	1-12-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	1-9-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	9-7-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	4-2-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	9-10-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	3-26-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	8-2-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	5-3-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	4-2-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	7-22-76

Expiration of patents: The patents within the range of numbers indicated below expire during March 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,926,352 to 2,931,037, inclusive
Plant Patents..... Numbers 1,919 to 1,925, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED APRIL 5, 1977

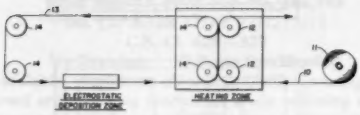
Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T957,001
DYEING PROCESS

James L. Chitwood, Rte. 8, 4412 Beechcliff Dr., Kingsport, Tenn. 37664

Continuation of Ser. No. 543,194, Jan. 22, 1975, abandoned.
This application Mar. 8, 1976, Ser. No. 664,462
Int. Cl.² D06P *5/00*
U.S. Cl. 8—2
1 Sheets Drawing. 3 Pages Specification

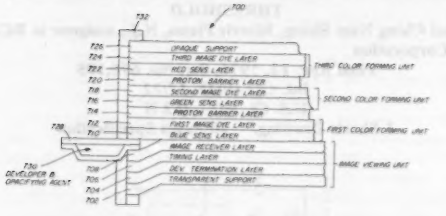


Disclosed is a process for dyeing comprising continually electrostatically depositing a powdered dye on a grounded electrically conductive reusable substrate, continuously positioning the grounded electrically conductive reusable substrate adjacent a heatable fabric and continuously heating the heatable fabric and powdered dye at a temperature and time sufficient to cause the powdered dye to diffuse into the fabric.

T957,002
PHOTOGRAPHIC IMAGE TRANSFER ELEMENT AND PROCESS

James W. Meyer, c/o Kodak Park Division, Rochester, N.Y. 14650

Continuation of Ser. No. 610,480, Sept. 3, 1975, abandoned.
This application Nov. 4, 1976, Ser. No. 738,767
Int. Cl.³ G03C *5/54, 7/00, 1/40*
U.S. Cl. 96—29 D
2 Sheets Drawing. 60 Pages Specification



A photographic element is disclosed which includes a support having as a coating thereon a radiation-sensitive layer capable of selectively releasing protons in exposed areas. In direct contact with the radiation-sensitive layer is an image-forming dye capable of shifting between a mobile and an immobile form in an aqueous medium upon protonation of a carboxy or amine substituent. The portion of the dye remaining mobile after imagewise protonation can be transferred to a receiver sheet to form a viewable dye image.

T957,003
METHOD OF CLEANING PVC REACTORS

Kenneth D. Freshour, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed July 12, 1976, Ser. No. 704,140
Int. Cl.² B08B *7/00*
U.S. Cl. 134—4
No Drawing. 8 Pages Specification

Surfaces of polyvinylchloride reactors are cleaned using a solvent gel composition. The solvent gel composition comprises: (a) solvent, (b) gelling agent, and (c), in some cases, a neutralizing agent. Suitable solvents include N-methyl-2-pyrrolidone, N-ethyl-2-pyrrolidone, and N-propyl-2-pyrrolidone. Suitable gelling agents include carboxy polymethylene polymer and hydroxyethyl cellulose. A suitable neutralizing agent is di-2-ethylhexylamine. The composition is applied to the reactor surfaces by conventional means, such as a brush. The composition is left on the reactor surface for at least one-half hour. It is then removed from the reactor surface for at least one-half hour. It is then removed from the reactor surface using a scraper (preferably non-metallic). If necessary, the entire process may be repeated to completely remove the deposits. In some cases it may be desirable to then apply the solvent per se in order to remove any film or polymer which may remain.

T957,004
ELECTROPHORETIC DEPOSITION OF STYRENE-MALEIC ANHYDRIDE COPOLYMERS

Jerry A. Dieter, Park Forest, and Robert C. Strand, Homewood, both of Ill., assignors to Atlantic Richfield Company, New York, N.Y.

Continuation of Ser. No. 479,012, June 13, 1974, which is a continuation of Ser. No. 264,215, June 19, 1972, which is a division of Ser. No. 834,540, June 18, 1969. This application Aug. 26, 1976, Ser. No. 718,305
Int. Cl.² C25D *13/06*
U.S. Cl. 204—181
No Drawing. 21 Pages Specification

An electrophoretic coating composition bath based on styrene-maleic anhydride copolymer is disclosed. The electrophoretic coating composition bath comprises a dispersion in water of an at least partially neutralized, partial ester of styrene-maleic anhydride copolymer, a cross-linking agent for the styrene-maleic anhydride copolymer, e.g., melamine-formaldehyde resin, and a neutralization agent for said styrene-maleic anhydride copolymer. The styrene-maleic anhydride copolymer has an about 1:1 to 4:1 molar ratio of styrene to maleic anhydride. The copolymer has a molecular weight of about 500 to 4,000 and is esterified to an acid number in the range of about 20 to 350. The copolymer is esterified to about 25 to 125% half-ester and neutralized to about 20 to 100% based on the esterified resin. The neutralizing agent suitable for use in the present invention can be for example, alkali metal hydroxides, ammonia, lower aliphatic amines, and lower aliphatic hydroxy amines. The bath can contain a coupling agent which is preferably a glycol ether, such as monopropylether of propylene glycol and n-butyl ether of ethylene glycol, or water-soluble solvent for the resin, e.g., n-butanol, propanol and cyclohexanol, or water-insoluble solvent, such as toluene xylene and mineral hydrocarbon solvents. The electrophoretic deposition process comprises passing a direct electric current through the electrophoretic coating composition bath to an object having a conductive surface which is immersed in said bath and connected as the anode in the system.

DEFENSIVE PUBLICATIONS

PUBLISHED APRIL 5, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T957,001
DYEING PROCESS

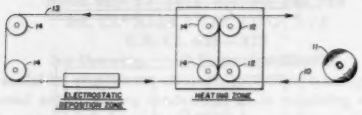
James L. Chitwood, Rte. 8, 4412 Beechcliff Dr., Kingsport, Tenn. 37664

Continuation of Ser. No. 543,194, Jan. 22, 1975, abandoned. This application Mar. 8, 1976, Ser. No. 664,462

Int. Cl.² D06P *5/00*

U.S. Cl. 8—2

1 Sheets Drawing. 3 Pages Specification



Disclosed is a process for dyeing comprising continually electrostatically depositing a powdered dye on a grounded electrically conductive reusable substrate, continuously positioning the grounded electrically conductive reusable substrate adjacent a heatable fabric and continuously heating the heatable fabric and powdered dye at a temperature and time sufficient to cause the powdered dye to diffuse into the fabric.

T957,002
PHOTOGRAPHIC IMAGE TRANSFER ELEMENT AND PROCESS

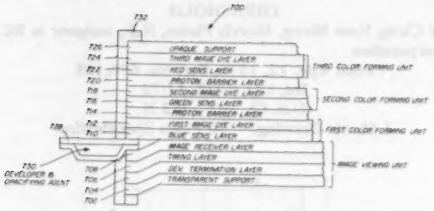
James W. Meyer, c/o Kodak Park Division, Rochester, N.Y. 14650

Continuation of Ser. No. 610,480, Sept. 3, 1975, abandoned. This application Nov. 4, 1976, Ser. No. 738,767

Int. Cl.² G03C *5/54, 7/00, 1/40*

U.S. Cl. 96—29 D

2 Sheets Drawing. 60 Pages Specification



A photographic element is disclosed which includes a support having as a coating thereon a radiation-sensitive layer capable of selectively releasing protons in exposed areas. In direct contact with the radiation-sensitive layer is an image-forming dye capable of shifting between a mobile and an immobile form in an aqueous medium upon protonation of a carboxy or amine substituent. The portion of the dye remaining mobile after imagewise protonation can be transferred to a receiver sheet to form a viewable dye image.

T957,003
METHOD OF CLEANING PVC REACTORS

Kenneth D. Freshour, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed July 12, 1976, Ser. No. 704,140

Int. Cl.² B08B *7/00*

U.S. Cl. 134—4

No Drawing. 8 Pages Specification

Surfaces of polyvinylchloride reactors are cleaned using a solvent gel composition. The solvent gel composition comprises: (a) solvent, (b) gelling agent, and (c), in some cases, a neutralizing agent. Suitable solvents include N-methyl-2-pyrrolidone, N-ethyl-2-pyrrolidone, and N-propyl-2-pyrrolidone. Suitable gelling agents include carboxy polymethylene polymer and hydroxyethyl cellulose. A suitable neutralizing agent is di-2-ethylhexylamine. The composition is applied to the reactor surfaces by conventional means, such as a brush. The composition is left on the reactor surface for at least one-half hour. It is then removed from the reactor surface for at least one-half hour. It is then removed from the reactor surface using a scraper (preferably non-metallic). If necessary, the entire process may be repeated to completely remove the deposits. In some cases it may be desirable to then apply the solvent per se in order to remove any film or polymer which may remain.

T957,004
ELECTROPHORETIC DEPOSITION OF STYRENE-MALEIC ANHYDRIDE COPOLYMERS

Jerry A. Dieter, Park Forest, and Robert C. Strand, Homewood, both of Ill., assignors to Atlantic Richfield Company, New York, N.Y.

Continuation of Ser. No. 479,012, June 13, 1974, which is a continuation of Ser. No. 264,215, June 19, 1972, which is a division of Ser. No. 834,540, June 18, 1969. This application Aug. 26, 1976, Ser. No. 718,305

Int. Cl.² C25D *13/06*

U.S. Cl. 204—181

No Drawing. 21 Pages Specification

An electrophoretic coating composition bath based on styrene-maleic anhydride copolymer is disclosed. The electrophoretic coating composition bath comprises a dispersion in water of an at least partially neutralized, partial ester of styrene-maleic anhydride copolymer, a cross-linking agent for the styrene-maleic anhydride copolymer, e.g., melamine-formaldehyde resin, and a neutralization agent for said styrene-maleic anhydride copolymer. The styrene-maleic anhydride copolymer has an about 1:1 to 4:1 molar ratio of styrene to maleic anhydride. The copolymer has a molecular weight of about 500 to 4,000 and is esterified to an acid number in the range of about 20 to 350. The copolymer is esterified to about 25 to 125% half-ester and neutralized to about 20 to 100% based on the esterified resin. The neutralizing agent suitable for use in the present invention can be for example, alkali metal hydroxides, ammonia, lower aliphatic amines, and lower aliphatic hydroxy amines. The bath can contain a coupling agent which is preferably a glycol ether, such as monopropylether of propylene glycol and n-butyl ether of ethylene glycol, or water-soluble solvent for the resin, e.g., n-butanol, propanol and cyclohexanol, or water-insoluble solvent, such as toluene xylene and mineral hydrocarbon solvents. The electrophoretic deposition process comprises passing a direct electric current through the electrophoretic coating composition bath to an object having a conductive surface which is immersed in said bath and connected as the anode in the system.

T957,005

BLOCK COPOLYMER PARTICLE FORMING PROCESS

John E. Gorman, 5422 Olympia Fields Lane, Houston, Tex. 77069

Continuation-in-part of Ser. No. 597,101, July 18, 1975, abandoned. This application June 15, 1976, Ser. No. 696,257

Int. Cl.[2] B29B *1/03*

U.S. Cl. 264—140

No Drawing. 8 Pages Specification

A process is provided for the formation of block copolymer particles having a reduced tendency to agglomerate which comprises extruding the block copolymer into a water bath in the presence of water-dispersible polyvalent metal salts of higher fatty acids and/or water-dispersible surfactants and forming nibs, pellets or strands in the bath. Suitable water soluble surfactants include anionic, cationic and non-ionic surfactants. Especially contemplated is the use of zinc stearate as the surfactant.

T957,006

ORIGINAL DOCUMENT REARRANGEMENT APPARATUS FOR USE IN RECIRCULATING FEEDERS

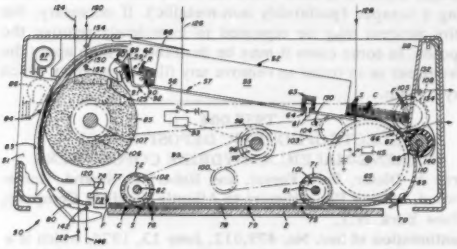
Michael Gerald Reid, 2294 Manitou Road, Rochester, N.Y. 14606, and William Edward Hunt, 39 Killarney Drive, Rochester, N.Y. 14616

Filed Mar. 30, 1976, Ser. No. 671,865

Int. Cl.[2] B65H *5/22*

U.S. Cl. 271—3.1

9 Sheets Drawing. 32 Pages Specification



Apparatus is disclosed for automatically rearranging documents in a recirculating feeder when a malfunction, such as a paper jam, has occurred in the feeder or in the copier. The use of a recirculating feeder facilitates the collation of the final copies produced by the copier without the need for a sorter accessory. If a malfunction, such as a paper jam, occurs in the copier, the automatic rearrangement apparatus initiates a feeding sequence in the feeder and causes the feeder to rearrange the original documents until the appropriate document is at the bottom of the stack for continuity in copying by the copier. If a malfunction occurs in the feeder, after the operator corrects the malfunction and replaces the original documents in their initial order in the feeder, the automatic rearrangement apparatus initiates a feeding sequence and rearranges the documents until the appropriate document is at the bottom of the stack for continuity in copying by the copier. At this time, the copier is ready to resume normal operation.

T957,007

VOLTAGE-MODE LOGIC CIRCUITRY WITH IMPROVED INPUT/OUTPUT CHARACTERISTICS

Paul V. Jordan, Poughkeepsie, and Robert F. Sechler, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

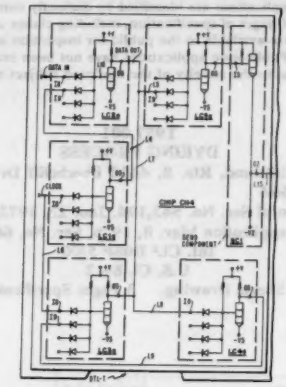
Continuation of Ser. No. 450,279, March 11, 1974, abandoned, which is a continuation of Ser. No. 265,136, June 22, 1972, abandoned. This application July 30, 1976, Ser. No. 710,764

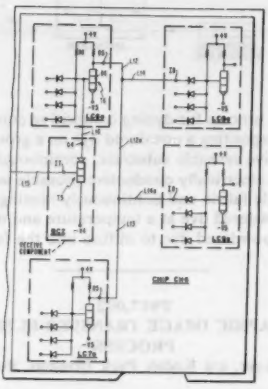
Int. Cl.[3] H03K *19/08;* **H01L** *27/00*

U.S. Cl. 307—213

9 Sheets Drawing. 22 Pages Specification

Coupling of signals between Large Scale Integrated Circuit chips is facilitated by provision of an emitter follower output stage for the chip. Special input circuits are also provided. The logic circuits may be DTL or Schottky TTL. The special input circuit may be a DTL type or a CTL (complementary transistor logic) type. Pull down resistors may be employed with the emitter follower output driver and the special DTL input circuit.





T957,008

SWITCHING CIRCUIT WITH ACCURATE CURRENT THRESHOLD

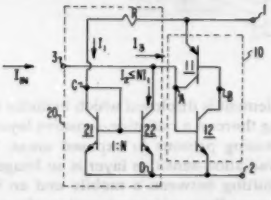
Abel Ching Nam Sheng, Morris Plains, N.J., assignor to RCA Corporation

Filed Apr. 12, 1976, Ser. No. 676,195

Int. Cl.[3] H03K *17/72*

U.S. Cl. 307—252 N

1 Sheets Drawing. 20 Pages Specification



A threshold current gate provides a diversion path for substantially all input current lower than a threshold value applied to the trigger electrode of a switch, such as a semiconductor

controlled rectifier (SCR), thereby inhibiting switch triggering. When the input current exceeds the threshold value, that portion which exceeds the same flows into and triggers the switch.

T957,009

NON-BLOCKING OXYGEN-RESISTANT VINYLIDENE CHLORIDE POLYMER COATING COMPOSITIONS

Robert G. Jahn, 2046 Sharp, Saginaw, Mich. 48602

Filed May 17, 1976, Ser. No. 686,755

Int. Cl.[2] B32B *27/30, 27/32, 5/16*

U.S. Cl. 428—327

No Drawing. 19 Pages Specification

Heat-sealable vinylidene chloride polymer coatings having improved anti-blocking tendencies while retaining resistance to oxygen transmission are obtained from aqueous dispersions of a normally crystalline vinylidene chloride polymer wherein such dispersions have incorporated therein from about 0.5 to about 5 percent based on the weight of normally crystalline vinylidene chloride polymer of a plurality of polymeric microspheres having an average diameter of between about 1 to about 5 microns, such microspheres consisting essentially of a vinylidene chloride polymer containing at least about 50 percent by weight of polymerized vinylidene chloride with any remainder of such polymer being one or more monoethylenically unsaturated comonomer.

T957,010

SEPARATION OF DILUENT FROM POLYMERIZATION REACTION MIXTURE

Denis George Harold Ballard, and Eric Jones, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 8, 1976, Ser. No. 664,986

Claims priority, application United Kingdom, Mar. 7, 1975, 9561/75

Int. Cl.[2] C08F *6/10, 6/00*

U.S. Cl. 526—130

No Drawing. 22 Pages Specification

A process for the separation of diluent from an ethylene polymerization reaction mixture wherein ethylene is copolymerized using as a catalyst an organo-metallic compound supported on an inorganic material. Subsequent to reaction, there is added to the reaction mixture a wetting agent and the diluent is then removed from the reaction mixture by steam distillation to give a product having significant solubility in the diluent.

A wide variety of wetting agents may be used, which may be either water-soluble or water-insoluble. However, water soluble wetting agents are much preferred, so that most or at least some of the wetting agent remains in the aqueous phase at the end of the steam distillation step. The wetting agent may also possess hydrocarbon solubility; but this does not appear to be of paramount importance. It should also be stable at the steam distillation temperature and should have low steam volatility. It is also convenient if the wetting agent is biodegradable to alleviate effluent disposal problems.

Examples of wetting agents include water soluble salts of di(hydrocarbyl) sulphosuccinic acids; poly(ethylene oxides) terminated with branched fluorocarbon groups, adducts of linear alcohols with ethylene oxide, and block copolymers of ethylene oxide and propylene oxide.

In general concentrations of wetting agent in the range 0.005 to 0.10% weight/volume, calculated on diluent, are suitable. Preferred concentrations are generally in the range 0.01 to 0.06% weight/volume.

REISSUES

APRIL 5, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,167

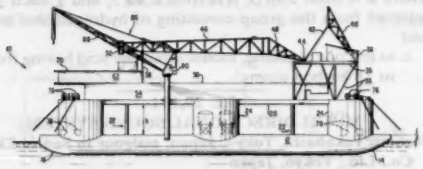
TWIN HULL VARIABLE DRAFT DRILLING VESSEL

Samuel Harry Lloyd, III, Mill Valley, Calif., assignor to Santa Fe International Corporation, Los Angeles, Calif.

Original No. 3,616,773, dated Nov. 2, 1971, Ser. No. 766,662, Sept. 4, 1968. Continuation of Ser. No. 221,769, Jan. 8, 1972, abandoned. Application for reissue May 15, 1975, Ser. No. 577,674

Int. Cl.² B63B *35/00*

U.S. Cl. 114—264 **66 Claims**



1. A variable draft vessel comprising:

a pair of elongated hulls disposed in side-by-side spaced substantially parallel relation one to the other;

a working platform;

means connected to said hulls and said platform to support said platform in spaced relation above said hulls;

said connecting means including at least six upstanding stabilizing columns disposed on said hulls, a pair of said columns being located adjacent opposite ends of said hulls on opposite sides of the pitch axis of the vessel, at least three columns being located on each hull and on opposite sides of the roll axis of the vessel;

said hulls having a combined displacement sufficient to float the vessel in a low draft condition with the hulls having freeboard;

and means for ballasting and deballasting the vessel to respectively submerge the hulls and portions of said connecting means below said platform below the waterline thereby to provide a high draft condition and refloat the vessel with the hulls having freeboard, the displacement of the submerged hulls and portions of said connecting means being sufficient to maintain the vessel buoyant in the high draft condition;

said connecting means being spaced one from the other to provide an open frame area between the components thereof and between said platform and said hulls;

the cross sectional area and configuration of said columns, the weight distribution of the vessel, and the geometry of the submerged hulls and portions of said connecting means being such as to maintain the natural period of the vessel in the high draft condition no less than six seconds;

said vessel having a length to width ratio of at least 2 to 1;

said stabilizing columns being connected to said hulls on the outboard sides thereof with the distance between the pitch axis and the centroid of the stabilizing columns on opposite sides of the pitch axis being greater than the transverse distance between the roll axis and the centroid of the stabilizing columns on opposite sides of the roll axis, said stabilizing columns having outboard portions thereof which extend transversely beyond the outboard sides of the respective hulls thereby providing increased moment for stabilizing action about the roll axis.

106. A column stabilized semisubmersible vessel consisting of a pair of elongated hulls disposed in substantially parallel spaced side-by-side relation with each of said hulls spaced from and lying on an opposite side of the longitudinal centerline of said vessel, said vessel further comprising;

a working platform spaced above said hulls a predetermined height and normally lying in a generally horizontal plane;

means for supporting said platform in fixed spaced relation above said hulls including at least three pairs of upstanding columns connecting with each of said hulls and said platform, each of said columns having a substantially constant cross sectional area over the effective height of the column between the platform and associated hull;

each of said hulls having an oblong transverse cross section with a breadth greater than its height and having top and bottom substantially planar parallel surfaces extending substantially the entire length of each hull;

a plurality of longitudinally spaced structural truss means interconnecting and reinforcing the structural relationship of the hulls, platform and columns, with such truss means including substantially transversely extending members structurally interconnecting uppermost portions of the hulls;

said vessel being generally rectangular in plan with the length of said vessel along its longitudinal centerline and roll axis being at least plural times as great as the width of said vessel along its transverse centerline and pitch axis;

at least three of said columns being located on each of said two hulls on opposite sides of the vessel's roll axis with pairs of such columns being located near opposite ends of each of said hulls on opposite sides of the vessel's pitch axis and another pair of said columns being located at an intermediate position on each of said hulls;

the configuration and cross-sectional areas of said columns throughout effective height thereof and the distances of said columns from the vessel's longitudinal roll axis and transverse pitch axis being such that said columns maintain the vessel's metacenter above the vessel's center of gravity for the high draft semisubmerged operating positions of the vessel and also being such that said columns provide righting moment about the longitudinal roll axis which is less than righting moment provided about said transverse pitch axis when the vessel is in semisubmerged column stabilized operating position;

said hulls having ballast compartments; and

means for ballasting said vessel when required to alter its draft between a low draft hull-supported floating condition in which the hulls have freeboard with said transversely extending members structurally interconnecting uppermost portions of the hulls being disposed above the mean waterline and a high draft semisubmerged column stabilized floating and operating condition in which the mean waterline is located along intermediate portion of said columns above said hulls and below the underside of said platform.

Re. 29,168

PHOTOGRAPHIC ELEMENTS WITH LIGHT ABSORBING LAYERS

Donald W. Heseltine; Philip W. Jenkins, and John D. Mee, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

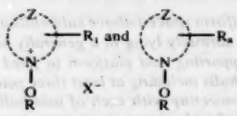
Original No. 3,745,009, dated July 10, 1973, Ser. No. 82,086, Oct. 19, 1970. Continuation of Ser. No. 766,307, Oct. 9, 1968, Pat. No. 3,615,432, which reissued Nov. 5, 1974 as Re. 28,225. Application for reissue July 1, 1975, Ser. No. 592,281

Int. Cl.² G03C *1/84, 1/02*

U.S. Cl. 96—84 R **21 Claims**

1. Sheet material adapted for making accurate visible records of light images and comprising, in combination as coextensive layers, transparent support means, transparent photosensitive means for recording said light images *forming at least one of said layers*, and, *as a remaining of said layers*, light-

absorptive heat decolorizable color means [which is] *consisting essentially of* a compound represented by a formula selected from the group consisting of:



wherein:

R_1 can be one of:

(a) a methine linkage terminated by a heterocyclic nucleus of the type contained in cyanine dyes,

[(b) an alkyl radical,]

(c) an anilinovinyl radical,

[(d) a hydrogen atom,

(e) an aryl radical,

(f) an aldehyde group,] and

(g) a styryl radical;

R_2 can be one of:

(a) a methine linkage terminated by a heterocyclic nucleus of the type contained in merocyanine dyes,

R can be one of:

(a) an alkyl radical, and

(b) an acyl radical;

X is an acid anion;

Z represents the atoms necessary to complete a five to six membered heterocyclic nucleus.

Re. 29,169

PROCESS FOR THE DEMONSTRATION AND DETERMINATION OF REACTION COMPONENTS HAVING SPECIFIC BINDING AFFINITY FOR EACH OTHER

Antonius Hermanus Wilhelmus Maria Schuurs, and Bauke Klaas van Weemen, both of Oss, Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

Original No. 3,791,932, dated Feb. 12, 1974, Ser. No. 221,447, Jan. 27, 1972. Application for reissue Jan. 26, 1976, Ser. No. 652,362

Claims priority, application Netherlands, Feb. 10, 1971, 7101728

Int. Cl.² G01N *31/14*

U.S. Cl. 195—103.5 A **6 Claims**

1. Process for the demonstration and determination of a component of the reaction between a bindable substance selected from the group consisting of an antigen, a hapten, and a low molecular substance, and a protein capable of binding said bindable substance specifically, said protein being selected from the group consisting of an antibody and a specific binding protein, comprising the steps of:

a. providing a given quantity of the binding partner of the component to be determined, which binding partner is in an insoluble form;

b. reacting the component to be determined with its binding partner to form a reaction mixture having a solid phase and a liquid phase;

c. separating the solid phase from the liquid phase;

d. adding to said solid phase a given quantity of a coupling product of the component to be determined with an enzyme; and

e. determining the enzyme activity of the solid phase which is a measure of the quantity of reaction component to be determined.

Re. 29,170

COATING COMPOSITION AND NOVEL COMPLEXER THEREFOR

Roger E. Burke, Savannah, Ga., assignor to Union Camp Corporation, Wayne, N.J.

Original No. 3,869,484, dated Mar. 4, 1975, Ser. No. 311,452, Dec. 4, 1972. Application for reissue Mar. 18, 1976, Ser. No. 668,299

Int. Cl.² C08H *17/36*

U.S. Cl. 260—404.5 **7 Claims**

1. A metal amine complexer, contained in an aqueous solution, consisting essentially of:

a. zinc;

b. from 0.9 to 6 moles, per mole of the metal, of a polyalkylene polyamine having the formula:

$$NH_2[(CHR)_aNH]_nH,$$

where a is from 2 to 3, n is from 2 to 5, and [each] R is selected from the group consisting of hydrogen and methyl; and

c. at lest one aliphatic, monocarboxylic acid having from six to 18 carbon atoms.

Re. 29,171

MULTI-DIRECTIONAL SOUND SYSTEM

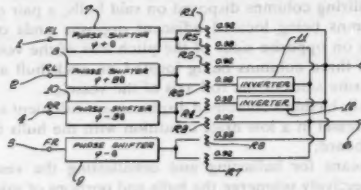
Susumu Takahashi, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan

Original No. 3,777,076, dated Dec. 4, 1973, Ser. No. 268,726, July 3, 1972. Application for reissue Dec. 20, 1974, Ser. No. 534,850

Claims priority, application Japan, July 2, 1971, 46-48674

Int. Cl.² G11B *3/74*

U.S. Cl. 179—100.4 ST **7 Claims**



1. An encoder system for producing two channel signals suitable for recording on a phono disc from first to fourth directional audio input signals, said encoder system comprising:

first to fourth input terminals for receiving said first to fourth audio input signals, respectively;

first and second output terminals from which said two channel signals are derived, respectively;

first to fourth phase shifter means coupled to said first to fourth input terminals, respectively, said first to fourth phase shifter means being operative to introduce relative phase differences of about +22.5°, +67.5°, −22.5° and −67.5° between said first to fourth audio input signals;

means connected in circuit with said first phase shifter means for coupling about 0.92 of said first audio input signal to said first output terminal;

means connected in circuit with said first phase shifter means for coupling about 0.38 of said first audio input signal to said second output terminal;

means connected in circuit with said second phase shifter means for coupling about 0.92 of said second audio input signal to said first output terminal;

means connected in circuit with said second phase shifter means for coupling about −0.38 of said second audio input signal to said second output terminal;

means connected in circuit with said third phase shifter means for coupling about 0.38 of said third audio input signal to said first output terminal;

means connected in circuit with said third phase shifter means for coupling about 0.92 of said third audio input signal to said second output terminal;

means connected in circuit with said fourth phase shifter means for coupling about −0 38 of said fourth audio input signal to said first output terminal; and

means connected in circuit with said fourth phase shifter means for coupling about 0.92 of said fourth audio input signal to said second output terminal.

Re. 29,172

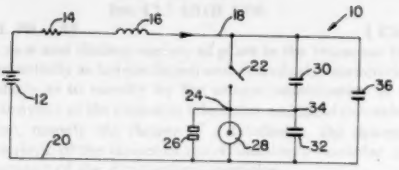
VOLTAGE-DIVIDING DC CIRCUIT BREAKER AND METHOD

Michael A. Lutz, Livermore, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Original No. 3,777,179, dated Dec. 4, 1973, Ser. No. 298,042, Oct. 16, 1972. Application for reissue Dec. 8, 1975, Ser. No. 638,720

Int. Cl.² H01H *33/00*

U.S. Cl. 361—3 **5 Claims**



1. A voltage dividing DC circuit breaker for breaking a circuit against line voltage and having circuit breaking components of insufficient capability for withstanding open circuit line voltage comprising:

first and second buses in said circuit breaker;

first and second serially connected switches connected between said buses and connected to an intermediate bus therebetween;

an electronic *crossed field* switch *device* capable of offswitching all the current through said circuit breaker against voltage build up less than the open circuit voltage connected in parallel to said second switch between said intermediate and second buses; and

first and second serially connected capacitors connected to said first and second buses and at their intermediate point connected to said intermediate bus, so that in normal conduction current flows through said circuit breaker through said first and second switches in the closed condition, and when said first and second switches are opened, said first switch arcs and said second switch forces the circuit current through said electronic *crossed field* switch *device*, and when said electronic *crossed field* switch *device* is offswitched, current through said first switch decreases so that its arc extinguishes and current builds up with the standoff voltage divided between said first bus, and said intermediate bus and said second bus in accordance with the capacities of first and second capacitors.

Re. 29,173

LASER TRANSMITTER SYSTEM

Richard A. Dye, and C. Raymond Berry, both of Santa Barbara, Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Original No. 3,909,745, dated Sept. 30, 1975, Ser. No. 515,810, Oct. 17, 1974. Application for reissue June 18, 1976, Ser. No. 697,584

Int. Cl.² H01S *3/096*

U.S. Cl. 331—94.5 PE **6 Claims**

1. A laser transmitter system comprising: mechanical energy-producing means;

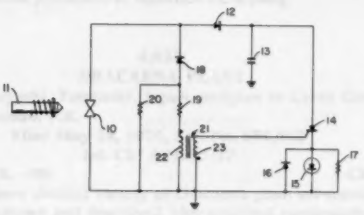
piezoelectric means for providing electrical signals in response to said mechanical energy-producing means;

a first diode coupled between said piezoelectric means and a storage capacitor;

a storage capacitor coupled to said first diode, said capacitor being charged in response to said piezoelectric means;

silicon controlled rectifier having first, second and third electrodes, said first electrode being coupled to said first diode, said silicon controlled rectifier for discharging said capacitor in response to a signal applied to said third electrode of said rectifier;

laser diode means coupled to said second electrode of said silicon controlled rectifier for providing an output signal in response to current being discharged therethrough;



a second diode being coupled between said piezoelectric device and a transformer; and

a transformer having primary and secondary windings, said primary winding being coupled to said second diode, said secondary winding being coupled to said third electrode of said silicon controlled rectifier, said transformer for providing a signal to said third electrode of said silicon controlled rectifier in response to said piezoelectric means.

Re. 29,174

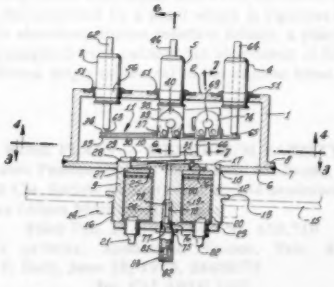
PRESSURIZED RELAY ASSEMBLY

Victor E. DeLucia, Santa Monica, Calif., assignor to Torr Laboratories, Inc., Van Nuys, Calif.

Original No. 3,891,950, dated June 24, 1975, Ser. No. 494,825, Aug. 5, 1974. Application for reissue Oct. 29, 1975, Ser. No. 626,645

Int. Cl.² H01H *1/66*

U.S. Cl. 335—151 **23 Claims**



17. A relay assembly comprising: a housing, normally opened contact means and normally closed contact means in said housing including terminals projecting from said housing, electromagnetic operating means for closing and opening said contact means upon energization and deenergization of said electromagnetic operating means, means forming a seal between said terminals and said housing, and means for admitting a pressurized dielectric gas into said housing, said contact means including spring contact arms, means pivotally supporting said spring contact arms including common terminals extending through said housing, and means pivotally and electrically connecting said spring arms on said common terminals.

PLANT PATENTS

GRANTED APRIL 5, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,032
GLADANTHERA GULDEMOND-MYRTA

Cornelius K. Guldemond, deceased, late of Ross Township, Kalamazoo County, Mich., by Myrta M. Guldemond, legal representative, assignor to Myrta M. Guldemond, Galesburg, Mich.

Division of Ser. No. 601,480. This application Mar. 26, 1976, Ser. No. 670,944

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—85 **1 Claim**

1. A new and distinct variety of plant in the Iridaceae family, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of the characteristics of the common Gladiolus and the *Acidanthera murielae*, namely the flower of a Gladiolus, the drooping characteristic of the flower of the *Acidanthera murielae*, and the fragrance of the *Acidanthera murielae*.

4,033
GLADANTHERA GULDEMOND-CORNELIUS

Cornelius K. Guldemond, deceased, late of Ross Township, Kalamazoo County, Mich., by Myrta M. Guldemond, legal representative, assignor to Myrta M. Guldemond, Galesburg, Mich.

Filed Aug. 4, 1975, Ser. No. 601,480

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—85 **1 Claim**

1. A new and distinct variety of plant in the Iridaceae family, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of the characteristics of the common Gladiolus and the *Acidanthera murielae*, namely the flower of a Gladiolus, the drooping characteristic of the flower of the *Acidanthera murielae*, and the fragrance of the *Acidanthera murielae*.

4,034
ROSE PLANT—LIFIRANE VARIETY

Jelle J. Zwemstra, Galgeweg 24, Postbus 35, Naaldwijk, Netherlands

Filed Mar. 24, 1976, Ser. No. 669,745

Claims priority, application Netherlands, Mar. 26, 1975, 7502853; Morocco, Oct. 30, 1975, 17282

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—19 **1 Claim**

1. A new and distinct variety of Grandiflora rose-plant of vegetative reproduction characterized by the fact that,

from the physical point of view, the plant with Spinach green adult wood, is erect, the flower is double, Rose Neyron in color, the petals are consistent and give the flower a form which initially is high-centered, and when open a form wherein the petals are projecting and overlapping,

from the biological point of view, this rose-plant is of vigorous vegetation, its capacity for re-blooming is excellent, and its flowers last a long time whether cut or on the plant,

substantially as shown and described.

4,035
DRACAENA PLANT

Hideo Obayashi, Totohashi, Japan, assignor to Cerro Gordo, Inc., Dorado, P.R.

Filed May 14, 1976, Ser. No. 686,662

Int. Cl.[2] A01H *5/12*

U.S. Cl. Plt.—88 **1 Claim**

1. The new distinct variety of Dracaena plant substantially as herein shown and described, characterized particularly by medium long, narrow, sword-shaped, dense spreading leaves, the leaves being compactly grouped and erect, the texture thereof being hard and the distinctive color pattern of its leaves with a marginal red-pink strip widening from base to apex, a less prominent mid-rib pink stripe merging with the marginal stripe at the apex, two green stripes on either side of the mid-rib stripe, widening from base to apex, coloration of all stripes on both sides being substantially the same.

4,036
ROSE PLANT

Ernest D. Williams, 1510 Lebanon Ave., Dallas, Tex. 75208

Filed Apr. 13, 1976, Ser. No. 676,569

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—7 **1 Claim**

1. A new and distinct variety of miniature rose plant of hardy, dwarf, rounded, much branched, bush type, substantially as illustrated and described, characterized by buds and flowers resembling Windy City (miniature — U.S. Plant Pat. No. 3,792) in general form and size; the bud and flower color resembling the variety Little Darling (Floribunda — U.S. Plant Pat. No. 1,581, expired) in the blending of yellow, pink and red but usually with more contrast, the general color effect being, yellow with contrasting shades of red; the small buds having rather long sepals with extra foliaceous parts; and further characterized by a plant which is vigorous and compact with abundant disease resistant foliage, a plant which is easily propagated from cuttings, an abundance of bloom with flowers borne singly or several to the stem in loose clusters.

4,037
ROSE PLANT — MEIRODIUM VARIETY

Marie-Louis Paolino, (widow of Francis Meilland), c/o Meilland & Cie, Societe en nom collectif, 134 boulevard du Cap, Antibes (Alpes Maritimes), France

Filed Feb. 17, 1976, Ser. No. 658,710

Claims priority, application France, Feb. 20, 1975, 75.00915; Italy, June 18, 1975, 24488/75

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—20 **1 Claim**

1. A new and distinct variety of hybrid tea rose-plant of vegetative reproduction, characterized by the fact that,

from the physical point of view, the plant with lettuce green adult wood, is erect, the flower is double, Blood red on the inside and cardinal red on the outside, the petals are firm and show a yellow unguis;

from the biological point of view, this rose-plant is of vigorous vegetation, blooms practically continuously, its flowers last a long time, and its petals drop off cleanly substantially as shown and described.

PLANT PATENTS

GRANTED APRIL 5, 1977

Illustrations for plant patents consist only of one figure and therefore a key to identify the drawing.

4,017
CLADANTHERA CELEBRATION-MERETA
Cornelius K. Cadmonsol, deceased, late of Bloo Township, Kalamazoo County, Mich., by Myrtle M. Cadmonsol, legal representative, assignor to Myrtle M. Cadmonsol, Galesburg, Mich.
Division of Ser. No. 601,480, Dec applications May 28, 1975, Pat. No. 4,79,044
Int. Cl.? A01H 5/00
U.S. Cl. PP.—83 1 Claim

1. A new and distinct variety of plant as in the Detailed Description, substantially as herein shown and described. Characterized particularly as to novelty by the unique combination of the characteristics of the unique combination of the characteristics of the common Cladantha and the Celebration variety, namely the flower of a Cladantha, the drooping habit of the flower of the Celebration variety and the foliage of the Celebration variety.

4,018
CLADANTHERA CELEBRATION-CORNELIUS
Cornelius K. Cadmonsol, deceased, late of Bloo Township, Kalamazoo County, Mich., by Myrtle M. Cadmonsol, legal representative, assignor to Myrtle M. Cadmonsol, Galesburg, Mich.
Filed Aug. 6, 1975, Ser. No. 601,480
Int. Cl.? A01H 5/00
U.S. Cl. PP.—83 1 Claim

1. A new and distinct variety of plant as in the Detailed Description, substantially as herein shown and described. Characterized particularly as to novelty by the unique combination of the characteristics of the common Cladantha and the Celebration variety, namely the flower of a Cladantha, the drooping habit of the flower of the Celebration variety and the foliage of the Celebration variety.

4,019
CLOVE PINK—LITHIANE VARIETY
John C. Zweneby, Cheyenne, Wyo., assignor to Zweneby Nurseries
Filed Mar. 24, 1976, Ser. No. 669,745
Claims priority, appl. plan Netherlands, Mar. 28, 1974, 7403823; Mar. 28, 1975, 7503823
Int. Cl.? A01H 5/00
U.S. Cl. PP.—19 1 Claim

1. A new and distinct variety of Grenadiny type plant as substantially as described and illustrated.

4,020
BROCADE PLANT
Hilde Dietrich, Tonawanda, Japan, assignee to Cave Tonda Inc., Tonawanda, N.Y.
Filed May 14, 1976, Ser. No. 686,847
Int. Cl.? A01H 5/00
U.S. Cl. PP.—88 1 Claim

1. The new distinct variety of Dracaena plant substantially as herein shown and described, characterized particularly by medium long narrow, round shape, dense upcurving leaves, the leaves being extremely pointed and stiff. The leaves are thereof being dark and are distinctive color pattern of cream with a irregular red spots and splashes, and a bold prominent mid rib pale cream merging into the cream of the leaf, new pinkish cream on older leaves and green on both sides being substantially the same.

4,021
ROSE PLANT
Dieter B. Wellens, 1810 Lehmer Ave., Dallas, Tex., 75216
Filed Apr. 22, 1976, Ser. No. 679,464
Int. Cl.? A01H 5/00
U.S. Cl. PP.—7 1 Claim

1. A new and distinct variety of plant as substantially as described and illustrated, characterized by its vigorous growth habit, dense foliage, medium green color, semi-glossy foliage, medium size flowers with a high petal count, flowers borne in clusters, flowers opening with a pink color and fading to a lighter pink color, and by its ability to withstand heat and drought.

4,022
CLIMBING PINK—ROSE VARIETY
Claude Hamilton, Jr., Hamilton, Ala., assignor to Hamilton Nurseries, Inc., Hamilton, Ala.
Filed Mar. 29, 1976, Ser. No. 671,263
Int. Cl.? A01H 5/00
U.S. Cl. PP.—19 1 Claim

1. A new and distinct variety of climbing pink plant substantially as herein shown and described, characterized by its vigorous, climbing habit of growth, its large, double, rose-pink flowers, its dark green, glossy foliage and its ability to withstand heat and drought.

4,023
CLIMBING PINK—WHITE VARIETY
Claude Hamilton, Jr., Hamilton, Ala., assignor to Hamilton Nurseries, Inc., Hamilton, Ala.
Filed Mar. 29, 1976, Ser. No. 671,264
Int. Cl.? A01H 5/00
U.S. Cl. PP.—19 1 Claim

1. A new and distinct variety of climbing pink plant substantially as herein shown and described, characterized by its vigorous, climbing habit of growth, its large, double, white flowers, its dark green, glossy foliage and its ability to withstand heat and drought.

PATENTS

GRANTED APRIL 5, 1977

ERRATA

For CLASS	See PATENT NO.
090–013.5	4,015,509
090–020.5	4,015,510
223–032	4,015,748
273–136 G	4,015,778
244–042 DA	4,015,787
248–168	4,015,806
125–021	4,015,931
075–201	4,015,947
075–157.5	4,015,948
428–653	4,015,949
428–648	4,015,950
002–159	4,016,027
428–542	4,016,183
358–083	4,016,361
358–142	4,016,362
358–248	4,016,363
358–245	4,016,364
200–277	4,016,401
361–222	4,016,455
361–228	4,016,456
361–049	4,016,457
361–052	4,016,458
361–088	4,016,459
361–018	4,016,461
361–117	4,016,462
361–383	4,016,463
361–433	4,016,464
361–433	4,016,465
361–278	4,016,466

PATENTS

GRANTED APRIL 5, 1977

ERRATA

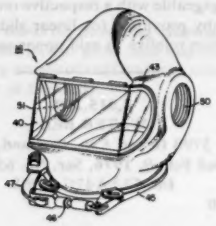
PATENTS

GRANTED APRIL 5, 1977

NOTE: A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

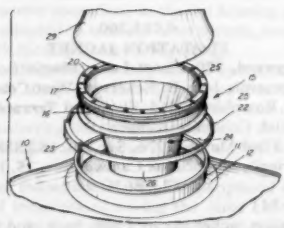
GENERAL AND MECHANICAL

4,015,294
DIVING HELMET ASSEMBLY
Wilbur J. O'Neill, Severna Park, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Nov. 15, 1972, Ser. No. 306,945
Int. Cl.[2] B63C *11/12*
U.S. Cl. 2—2.1 R **14 Claims**



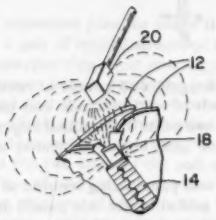
1. A diving helmet assembly comprising:
A. an adapter unit for placement on the diver's head and having a standardized outer surface;
B. a helmet body for placement on said adapter unit and having a standardized inner surface generally conforming to said outer surface of said adapter unit;
C. said helmet body including,
i. a helmet body shell portion, the interior of which includes said standardized inner surface; and
ii. insulation means disposed over the outside of said helmet body shell;
D. at least one gas conduction duct disposed on the outside of said helmet body shell; and
E. said insulation means being also disposed over said gas conduction duct.

4,015,295
DIVING SUIT AND NECK SEAL THEREFOR
Woodrow A. Lancaster, 207 S. Main St., Middleton, Mass. 01949; William T. Jebb, 88 Holly St., Gloucester, Mass. 01930, and Alan M. Chagan, 25 Appleton Ave., Beverly, Mass. 01915
Filed Apr. 15, 1976, Ser. No. 677,217
Int. Cl.[2] B63C *11/04*
U.S. Cl. 2—2.1 R **10 Claims**



1. A diving suit for use with a helmet having a dam, said suit including a body section, a collar, and a neck seal, said neck seal including first and second rings dimensioned to permit the head of the wearer to pass freely therethrough and freely to encircle his neck, a neck dam in the form of a sleeve extending downwardly through said first ring with its upper end overlying said first ring, said second ring overlying said upper dam end and detachably attached to said first ring and clamping said dam end therebetween, said first ring having an external channel over which both the collar of the suit and the helmet dam extends and clamping means encircling said first ring and securing said collar and neck dam in said channel.

4,015,296
ELASTIC STOCKING
Frank Malick, 8836 Major Ave., Morton Grove, Ill. 60053
Filed Mar. 17, 1976, Ser. No. 667,709
Int. Cl.[2] A41B *11/00*
U.S. Cl. 2—239 **2 Claims**



1. An elastic stocking having external and internal sides, and a leg engaging portion including two longitudinal edges having internal and external sides, respectively, comprising:
a zipper having two synthetic plastic material engaging portions and magnetizable material slider means movable along said engaging portions from a first position to a second position and vice versa for closing and opening said zipper, respectively, said engaging portions being attached to said internal sides of said stocking and spaced from said longitudinal edges, whereby said edges overlap in the closed portion;
magnet means for moving said magnetizable material slider means, said magnet means being positioned on the external side of said stocking along said edges for selectively closing and opening said zipper contactlessly, whereby, upon said slider means having attached said engaging portions to one another in said first position and upon said magnet means moving said slider means from said first to said second position, said longitudinal edges overlap with one another thereby substantially preventing said zipper being visible from the external side of said stocking.

4,015,297
SAFETY CANOPY FOR CRIB
Dorothy A. Christian, P.O. Box 1493, Sedona, Ariz. 86336
Filed Nov. 26, 1975, Ser. No. 635,717
Int. Cl.[2] A47C *29/00*; B65B *11/00*
U.S. Cl. 5—97 **2 Claims**

1. A safety canopy for use in combination with a generally rectangular crib for containing a child and including a pair of spaced upright stationary end panels and a pair of spaced upright side panels extending between said end panels, at least one of said upright side panels being movable, said canopy comprising:
a shallow inverted box-like structure sized and shaped to closely receive and conform to the upper portion of said crib therein and including,
i. a substantially horizontal top panel of flexible foraminous material, sized and shaped to overlay said crib and having opposed pairs of end and side edges,

reinforcing means for positioning and at each corner of securing said box-like structure on said crib independently of the movable side panel for permitting movement of the movable side panel without interference by said canopy in its secured position including,

ii. a pair of elongate side panels of reinforced flexible material, each of said elongate side panels being secured along one of its longitudinal edges to one of said side edges of said horizontal panel and depending therefrom, and

iii. a pair of elongate end panels of reinforced flexible material, each of said elongate end panels being secured along one of its longitudinal edges to one of said end edges of said horizontal panel and depending therefrom,

each said elongate end panel being secured at its ends to the adjacent ends of said elongate side panels and forming the substantially vertical corners of said box-like structure; and

b. attachment means extending downwardly from said elongate end panels proximate each corner of said box-like structure for detachably securing said structure solely to the stationary portion of said crib.

4,015,298

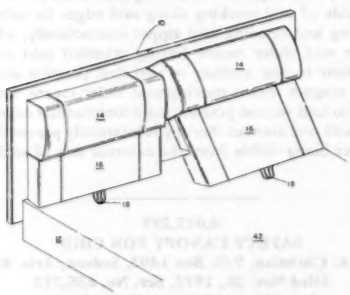
TILTABLE HEADBOARD

Chester A. Scott, Ridgeview Drive, Burlington, Iowa 52601

Filed Feb. 2, 1976, Ser. No. 654,240

Int. Cl.[2] A47C *21/00*

U.S. Cl. 5—327 B **6 Claims**



1. A tiltable suport unit for the upper body and head usable in connection with a generally horizontal supporting surface such as a bed or seat and the like, said tiltable support unit h.ving a front surface engageable by the upper body and head and comprising: a generally hollow box-like upper section mountable on a stationary pivot above said horizontal supporting surface for swingable movement of said unit out over said horizontal supporting surface to a selected inclined position, a lower section attached to and swingable with said upper section, and guide means combined with said upper section and said lower section to provide for free telescopic movement of said lower section inside of said upper section and toward and away from said upper section thereby to vary the length of said unit as it is swung about said stationary pivot, the bottom of said lower section providing a flat surface inclined upwardly from the front surface of the unit toward the rear, said flat surface being engageable with said horizontal supporting surface when said unit is swung to a selected inclined position with said lower section extended whereby said unit is maintained in said selected inclined position, said upper section having a front, sides and a top and being open at the bottom, said guide means including a first guide member affixed to the inside of each side of said upper section, said lower section being of a generally box-like construction with a front, sides and bottom, and a second guide member of said guide means affixed to the inside of each side of said lower section and engageable with a respective one of said first guide members thereby providing for linear slidable movement of said lower section relative to said upper section.

4,015,299

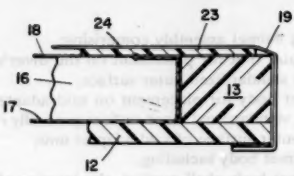
WATER BED

Robert Tinnel, 3798 Grand Ave., Oakland, Calif. 94610

Filed Feb. 9, 1976, Ser. No. 656,605

Int. Cl.[2] A47C *27/08*

U.S. Cl. 5—370 **2 Claims**



1. A bed construction comprising a base member formed of a thick sheet of dense foam material, a border member formed of a resilient, dense foam material secured to the periphery of said base member, said border member extending continuously about said periphery and projecting upwardly therefrom, said border member including an interior wall extending generally orthogonally from said base member; said bed construction also including a seating area at the periphery therof, said seating area comprising a broad, laterally extending upper surface of said border member, said base member and sid interior wall of said border member defining an upwardly opening coffer having generally vertical side walls, a water mattress disposed within said coffer, and a resilient, insulating pad extending over said water mattress and said upper surface of said border member.

4,015,300

FLOTATION JACKET

John S. Hayward, 570 Linnet Lane; Martin S. Collis, 2415 Alpine Crescent; John D. Eckerson, West Coast Road, and Lorne K. Rosenblood, 965 Kentwood Terrace, all of, Victoria, British Columbia, Canada

Filed May 6, 1976, Ser. No. 683,858

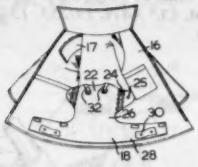
Claims priority, application Canada, Nov. 25, 1975, 240373

Int. Cl.[2] B63C *9/10*

U.S. Cl. 9—341 **1 Claim**

1. A flotation jacket having front, back, and arm portions with flotation material therein to provide adequate inherent buoyancy for an adult, and a flap secured to the lower terminal edge of the jacket and foldable between a concealed position on the inside of the jacket and a deployed position suspended from the said lower edge of the jacket; said flap, in the deployed position having a main panel for passage between the legs of the wearer and securement to the front of the jacket thereby enclosing the groin area; and a pair of wing panels, one on either side of the main panel, said wing panels

being adapted for encirclement of the upper thigh area; and means for securing the panels in their concealed and abdominal enclosing positions; said flap comprising waterproof insu-



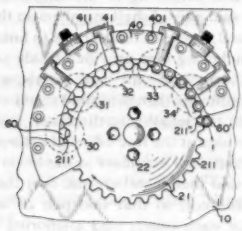
lative closed-cell material providing thermal protection to vital heat loss areas in the groin and mid-thigh area of the wearer and limiting access of cold water to other high heat loss areas of the trunk of the body.

4,015,301

CUT-OFF STOCK FEEDING DEVICE FOR AN AUTOMATIC HIGH SPEED COLD NUT FORMER

Yuan Ho Lee, 85, Jen Ho Road, Tainan, China /Taiwan

Filed Aug. 19, 1975, Ser. No. 605,840
Int. Cl.² B21J *5/12*; **B21K** *1/64, 27/00*
U.S. Cl. 10—76 T **2 Claims**



1. In combination with an automatic, high-speed, cold nut former having a plurality of insert dies arcuately positioned such that the center of each die is located with equal circular pitch along the circumference of a circle and allocated in order of successive operations in the nut forming process and a drive shaft adapted to transmit intermittent, rotary motion, a cut-off stock feeding device comprising:

a transfer feeding disc coaxially affixed upon one end of said drive shaft, the peripheral edge of said disc in alignment with the locus of the centers of said dies, said disc sequentially transferring the cut-off stock blanks to the center of each of said plurality of dies upon intermittent rotation of said shaft;

a plurality of indentations along the peripheral edge of said disc, said indentations having the same contour as one side of the formed article to receive and accommodate the cut-off stock blanks;

means for transferring a cut-off stock blank to a die from the indentation aligned with said die;

means for returning, upon completion of a forming operation, said cut-off stock blank from said die to the same indentation from which said blank was transferred; and

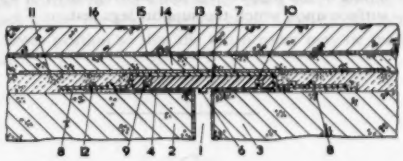
means cooperating with said disc for retaining said stock blank in said indentation upon return of said blank from one of said dies.

4,015,302

EXPANSION JOINTS

Michael Nicholson Clark, Taunton, England, assignor to Secretary of State for Environment in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed May 9, 1975, Ser. No. 576,120
Claims priority, application United Kingdom, May 10, 1974, 20901/74
Int. Cl.² E01D *19/06*
U.S. Cl. 14—16.5 **13 Claims**



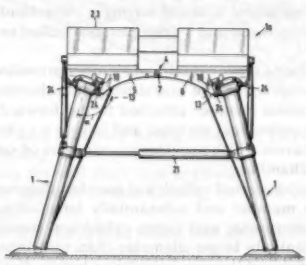
1. A buried expansion joint for use in the construction of a bridge having a pair of spaced structural members each covered with a waterproofing layer and surmounted by a roadway, said expansion joint comprising a pad of flexible plastics material located over the gap formed between said structural members, and a flashing of flexible plastics material extending in a direction transverse of the gap over the said pad and downwardly at the two sides of the pad and then outwardly along the surface of said structural members, the outwardly extending edge portions of said flashing lying beneath said waterproofing layers, said edge portions having means attaching said edge portions to said waterproofing layers.

4,015,303

SUPPORT ELEMENT FOR A BRIDGE

Wolfgang Eyb, Leonberg; Friedhelm Soffge, Kornwestheim; Ortwin Piper, Schwieberdingen, and Gerhard Albrecht, Illingen, all of Germany, assignors to Firma Dr. Ing. h.c.f. Porsche Aktiengesellschaft, Germany

Filed May 12, 1975, Ser. No. 576,446
Int. Cl.² E01D *19/02*
U.S. Cl. 14—75 **29 Claims**



1. Supporting apparatus for bridge portions, especially for a portable bridge of the type including a plurality of bridge portions connected to one another; said apparatus comprising:

carrier means for supporting said bridge portions including two carrier sections have the bridge portions mounted thereon,

means for pivotally connecting the two carrier elements to one another, said bridge portions being arranged on respective sides of said pivotal connecting means,

a pair of support legs spaced from one another;

means for pivotally supporting the respective support legs at free ends of the respective carrier sections for movement between respective storage positions and in-use positions with said support legs supporting said carrier means, and

a holding element connecting said support legs to one an-

other, said holding element being separate from and spaced from said carrier means when said support legs are in their in-use positions,

wherein said holding element, said pivotal connecting means of said carrier elements, and the respective pivotal supporting means of said support legs are spaced from one another so as to form a three-hinge support for the bridge portions whereby said two carrier sections and the bridge portions associated therewith are adapted to execute compensating movements about the pivotal connecting means in response to at least one of an adjustment of a base of the support legs and an irregularity of a support surface upon which the support legs rest.

4,015,304

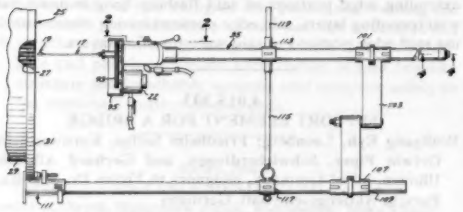
DRILLING OR REAMING MACHINE

Lester L. Dillinger, 8632 Park St., Bellflower, Calif. 90706

Continuation of Ser. No. 464,051. This application June 30, 1975, Ser. No. 591,522

Int. Cl.² B08B *9/02*

U.S. Cl. 15—104.1 R **6 Claims**



1. A machine for reaming heat exchanger tubes, comprising:

a hollow drive shaft adapted to be reciprocably driven along its longitudinal axis and having a cutterhead attached to its forward end and a drive piston attached to its rearward end;

an elongated inner cylindrical member providing a chamber for reciprocation of said drive piston therein;

an extension member attached to the forward end of said inner cylindrical member and having a cylindrical opening therein which provides an extension of said reciprocation chamber;

an outer elongated cylindrical member disposed about said inner member and substantially longitudinally coextensive therewith, said outer cylindrical member being of substantially larger diameter than said inner cylindrical member and thereby providing a longitudinally extending passageway between said two members;

closure means attached to the rearward ends of said inner and outer cylindrical members to close said passageway;

said extension member being also attached to the forward end of said outer cylindrical member for closing off the forward end of said passageway;

a forward drive opening formed in said inner cylindrical member near the rearward end thereof and communicating said passageway with said reciprocation chamber;

said extension member having a reversing drive opening extending laterally therein and communicating with said reciprocation chamber; and

four-way valve means supported upon said extension member and selectively operable for applying fluid pressure either to said reversing drive opening, or through said passageway to said forward drive opening.

4,015,305

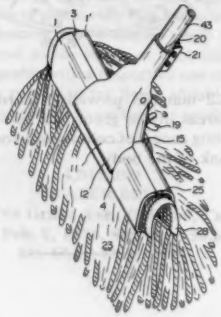
MOP HOLDER

Toshiyoshi Komatsu, Osaka, Japan, assignor to Duskin Franchise Co., Ltd., Osaka, Japan

Filed Mar. 3, 1976, Ser. No. 663,442

Int. Cl.² A47L *13/255, 13/258*

U.S. Cl. 15—150 **9 Claims**



1. A mop holder comprising a holding member for holding a mop formed of a synthetic resin having a high resistance to folding, a handle shaft and a linking member for linking said holding member to the handle; wherein said holding member comprises a pair of shell members integrally formed of said synthetic resin and extending in the lengthwise direction, a hinge that links said pair of shell members so that they can be opened and closed, a pair of teeth trains to hold the mop, and a plurality of anchoring pins provided inside said shell members; the outer surface of said shell members being convex, said hinge being thinner than said shell members, and flexible and extending in the lengthwise direction; said pair of teeth trains being provided at the free edges of extension plates bent inwardly from said shell members at the lower edge opposite to the hinge of said shell members and over the entire lengthwise direction thereof, so that said pair of teeth trains are disposed to face each other; said anchoring pins being arranged in the vicinity of both ends, in the lengthwise direction, of said shell members to protrude inwardly of said shell members, so that when said pair of shell members are closed, the anchoring pins provided on each of the shell members engage with the mop alternately; a recessed groove on the outer surface of each of said pair of shell members near said lower edge and at the central part in the lengthwise direction, a said recessed groove being in parallel to said lower edge so as to mount thereon a linking member; said linking member being equipped with a stop piece that is inserted in said recessed groove at the lower edge and includes a support member having a tightening-loosening tube into which is inserted the handle shaft at the upper part, a bracket being pivotally attached to said support member and having at the lower edge a stop piece that will be inserted in the other of said recessed grooves, and a fastening mechanism provided on said support member and bracket to adjust the clearance between the stop piece of said support member and the stop piece of said bracket; said holding member being inserted in a space defined by said support member and said bracket, so that said teeth trains are positioned outwardly and said hinge disposed inwardly in said space; said pair of stop pieces being fitted to said pair of recessed grooves, respectively; and wherein the mop is detachably fastened to said linking member by said fastening mechanism.

4,015,306

APPLICATOR PADS

Larry A. Fenster, 301 Birch Drive, Roslyn, N.Y. 11576

Division of Ser. No. 264,631. This application Nov. 21, 1973, Ser. No. 417,926

Int. Cl.² A47L *13/16*

U.S. Cl. 15—209 R **9 Claims**

1. A pad for applying automobile polish to the painted surfaces of an automobile, said pad comprising a resilient absorbant foam core and a fibrous fabric covering thereover, for applying said polish to the painted surface of an automobile by bringing said fabric covering, on said pad, into contact with said body of polish to pick up the polish thereon and then bringing said fabric covering, on said pad, into contact with said painted surface to apply the polish thinly to said surface, said pad being adapted to be compressed to express air therefrom and then permitted to expand during use and being adapted to be reused, said fabric covering comprising spaced layers of air-permeable fabric, covering opposite faces of said core, extending beyond the periphery of said core, and having meeting free edges adjacent said core, the improvement in which said pad comprises a film of heat-sealable organic plastic disposed on each of said faces of said core between said core and said covering and, around the entire periphery of said core, a fused band where said free fabric edges are joined to each other and to said film by fused film material, said film having a hole to permit air to flow from and to said core when said core is, respectively compressed and permitted to expand.

4,015,307

APPARATUS FOR CLEANING ROTATING CYLINDRICAL SURFACES

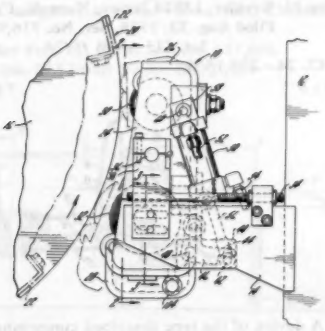
Joseph J. Kossak, Roselle, N.J., assignor to Oxy-Dry Sprayer Corporation, Chicago, Ill.

Continuation of Ser. No. 66,524. This application Nov. 20, 1974, Ser. No. 525,478

Claims priority, application United Kingdom, Aug. 25, 1969, 42333/69

Int. Cl.² A46B *15/00;* **B41F** *35/00;* **B41L** *41/00*

U.S. Cl. 15—256.52 **10 Claims**



1. An apparatus for cleaning a rotating cylindrical surface containing undesired foreign matter thereon comprising, a scrub means including a rotatable brush roller having an axis and substantially radially extending bristles, means for moving the rotatable brush into and out of contact with the surface being cleaned, means for supplying a predetermined amount of solvent for the foreign matter to the bristles of the brush, means including a wiper roller having an absorbent surface for drying the surface which has been scrubbed, means for moving the wiper roller into and out of contact with the scrubbed surface, a flicker bar including a substantially flat inclined surface positioned to contact the bristles at an angle and for a distance sufficient to allow the individual bristles to flex so as to remove the foreign matter therefrom, the flicker bar being positioned with respect to the brush in such a fashion that substantially all of the foreign matter removed from the bristles is not allowed to return to the brush and, a housing having an upper portion for the wiper roller and a lower portion for the brush roller, the upper portion being hingedly connected to the lower portion so that the brush roller may be readily exposed.

4,015,308

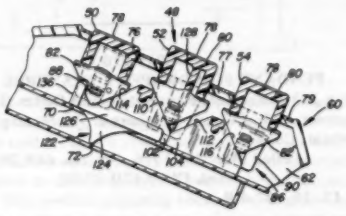
VACUUM BLEED SYSTEM FOR A VACUUM CLEANER OR THE LIKE

Clifford P. Rickmers, North Canton, Ohio, assignor to The Hoover Company, North Canton, Ohio

Filed Oct. 29, 1975, Ser. No. 626,744

Int. Cl.² A47L *9/00*

U.S. Cl. 15—339 **15 Claims**



11. A floor care appliance having means for varying suction air flow including;

a. a housing for said floor care appliance,

b. a single aperture in said housing for the admittance of bleed air,

c. a motor and fan system within said housing for inducing suction air flow into said housing,

d. a valving arrangement carried with said housing that modulates the flow of bleed air into said housing,

e. said valving arrangement driven by a series of operator actuatable push buttons,

f. said push buttons directly driving portions of said valving arrangement to modulate said flow of bleed air,

g. means for providing an automatic cancelling feature for said push buttons, separate from said valving arrangement and said push buttons, and

h. portions of said valving arrangement including means for sealing said single aperture in said housing for providing one modulated flow of bleed air to said housing and separate means vertically imposable in the path of said bleed air and abuttingly sealing against said housing for providing a second modulated flow of bleed air to said housing.

4,015,309

HINGE WITH COMPRESSIONS SPRING FOR COUNTER-BALANCING WEIGHT OF LEAVES

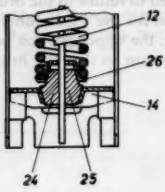
Wilhelm Gronbach, Dr. Fritz-Huber-Str. 73, 8090 Wasserburg,Inn, Germany

Filed Nov. 20, 1975, Ser. No. 633,611

Claims priority, application Germany, Nov. 22, 1974, 2455419

Int. Cl.² E05F *1/12*

U.S. Cl. 16—190 **5 Claims**



1. A hinge with compression spring for counter-balancing the weight of leaves, e.g. covers, flaps or the like that are pivotable about a horizontal axis, particularly on freezer chests, wherein one end of the compression spring supports itself in the fixed hinged portion with the prestressing and its other end, by way of the end of a guide rod supporting the compression spring, engages the second hinge portion that is attached to the leaf, wherein the guide rod for the spring is supported at its lower end, through the interposition of a rocker, on a knife bearing of the fixed hinged portion, wherein brake jaws are disposed between the end of the guide rod supporting the compression spring and the associated end of the compression spring, said brake jaws being in the form of a double cone, one cone being at the side facing the rocker and guided in a complementary conical hole of the rocker and the other cone facing the compression spring.

4,015,310

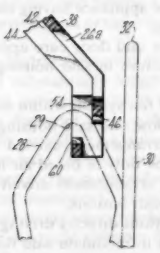
PENDANT FOR DRAPERY TRAVERSE ROD

Walter J. MacFarlane, Kensington, and Dieter G. Koss, Middletown, both of Conn., assignors to The Stanley Works, New Britain, Conn.

Filed Mar. 18, 1976, Ser. No. 668,282

Int. Cl.² A47H *15/00*

U.S. Cl. 16—87.4 R **8 Claims**



1. For use with a drapery rod suited for supporting drapes and a conventional drapery hook having a reversely bent upper end provided with an apex attached to the drape heading thereof, a drapery hanger having an eye to receive the reversely bent end of the hook, said drapery hanger including means for attachment to the drapery rod extending from one face thereof and having a downwardly depending portion providing an enlarged eye to facilitate the insertion of the end of the hook, said eye having a top wall adjacent said one face of the hanger for facing the drape and a bottom wall adjacent the face of the hanger opposite said one face for facing away from the drape to provide a supporting surface for the apex of the reversely bent end of the hook, said supporting surface being vertically offset to the rear of said top wall and away from said one face so that the lifting of said hook relative to the hanger causes the apex of the hook to pass to the rear of the hanger thereby to prevent inadvertent disengagement thereof.

4,015,311

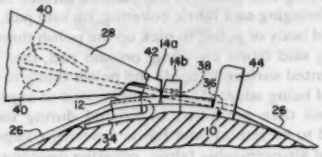
BUCKLE WITH A VISUAL TENSION INDICATOR

Gary Martin Curtis, Seattle, Wash., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Apr. 28, 1976, Ser. No. 681,108

Int. Cl.² F16L *33/00*

U.S. Cl. 24—23 R **4 Claims**



1. In a buckle for securing ends of a complementary looped band together about a workpiece under predetermined tension, said buckle including a body having substantially parallel spaced top and bottom walls and side walls joining the top and bottom wall to each other, means on said bottom wall of said body to accept and anchor a first free end of the complementary band, said top and bottom walls of said body providing a throat to accept the second free end of the complementary band, said top wall presenting an edge against which a complementary tensioning tool can be seated for stretching the complementary band to a predetermined degree of tension, said top wall having a slot intermediate its margins traversing a substantial portion of its extent and extending between said side walls, a top wall portion at least one side of said slot being distortable as force is applied against the edge by the complementary tensioning tool to visually indicate that the desired tension has been applied, and means for securing the second end of said band relative to said buckle to permanently set the said band relative to said buckle in tensioned condition.

4,015,312

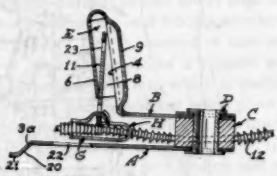
TAB PULLER AND SLIDE FASTENER PROTECTOR

Marion M. Krekler, 13824 Jersey, Norwalk, Calif. 90650

Filed Aug. 23, 1976, Ser. No. 716,978

Int. Cl.² A44B *19/26*

U.S. Cl. 24—205.15 H **7 Claims**



1. A device of the type described comprising:

a. a lower arm;

b. an upper arm;

c. means for pivotally interconnecting the ends of the two arms together and for spacing them apart so that the lower arm can be swung from a closed position where the lower arm underlies the upper arm, into an open position

where the lower arm is swung away from the upper arm but still lies in a plane substantially parallel to the plane in which the upper arm swings;

d. said upper arm having a housing whose entrance is adapted to receive the tab of a slide fastener, the tab being held in said housing when the lower arm is swung back into a position underlying the upper arm; and

e. a cord connected to the device for pulling it along the slide fastener for interconnecting the two rows of teeth of the slide fastener.

4,015,313

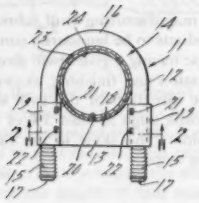
U-BOLT CLAMPING ELEMENT

William G. Oldford, 4944 Lakeshore, Lexington, Mich. 48450

Continuation of Ser. No. 462,624. This application May 28, 1975, Ser. No. 581,540

Int. Cl.² B65D *63/00*

U.S. Cl. 24—277 **1 Claim**



1. A clamp for a cylindrical element embodying a U-bolt having an arcuate web and two extending legs, teeth on said legs having parallel top surfaces with inwardly sloping walls therebelow forming arcuate notches, a saddle constructed from a sheet metal body having a central web portion with an arcuate edge, aperture portions on said body disposed on either side of said central web which receive said legs , and a plurality of vertically spaced fingers formed integrally with the body having the ends extending into the aperture portions in position to deflect inwardly and outwardly over the sloping walls of the legs until one of the ends in each aperture portion rests upon the top surface of a tooth on each leg, the plurality of fingers being fractionally spaced a portion of the distance between a pair of said parallel top surfaces of the teeth. /

4,015,314

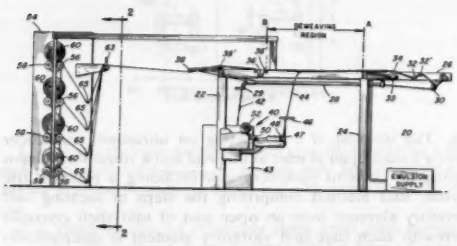
YARN TAPE DEWEAVING METHOD AND APPARATUS

William Dan Hurst, Dalton, Ga.; Donald E. Huffman, Chattanooga, Tenn.; Hermon A. King, and Jack Puckett, both of Dalton, Ga., assignors to Dixie Yarns, Inc., Chattanooga, Tenn.

Filed Feb. 11, 1976, Ser. No. 657,056

Int. Cl.² D04B *19/00;* **D03J** *1/04*

U.S. Cl. 28—17 **9 Claims**



1. Apparatus for removing a filler thread from a multiple end yarn tape, comprising:

first means defining a yarn tape path and a filler thread removal region;

yarn end take-up means, located downstream of said first means along said yarn tape path, for separately taking up each end of said multiple end yarn tape and for maintaining a substantially uniform speed of said yarn tape along said path;

filler thread take-up means, located upstream of said yarn end take-up means along said yarn tape path, for removing said filler thread from said tape in said filler thread removal region; and

means coupled to said filler thread take-up means for controlling the speed at which said filler thread take-up means removes said filler thread from said yarn tape, including means for preventing the location at which said filler thread is removed from said yarn tape from moving outside said filler thread removal region.

4,015,315

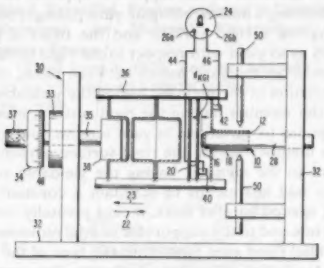
METHOD OF SETTING CATHODE-G1 SPACING

Robert Porter Stone, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed July 14, 1975, Ser. No. 595,808

Int. Cl.² H01J *9/18*

U.S. Cl. 29—25.16 **4 Claims**



1. A method of manufacturing a television tube electron gun assembly including at least one oxide cathode and a G1 grid wherein said G1 grid is assembled into a unitary structure and said cathode is subsequently inserted to a predetermined spacing relative to said G1 grid, said spacing being determined with the aid of a position adjusting micrometer and an electrical continuity indicator having a pair of measurement terminals, said method comprising the steps of:

a. moistening said oxide cathode with water thereby causing said oxide cathode to become electrically conductive;

b. removeably mounting said cathode on fixed cathode support means;

c. removeably mounting said unitary structure on said position adjusting micrometer for adjusting and measuring the position of said G1 grid;

d. connecting one of said measurement terminals of said electrical continuity indicator to said cathode and the other measurement terminal to said G1 grid;

e. advancing said G1 grid toward said fixed cathode until said continuity indicator indicates electrical continuity between said cathode and said G1 grid;

f. measuring the position of the G1 grid when electrical continuity is obtained;

g. withdrawing said G1 grid from said cathode to a measured position which is equal to the algebraic sum of the predetermined spacing and the measured position at which electrical continuity was obtained;

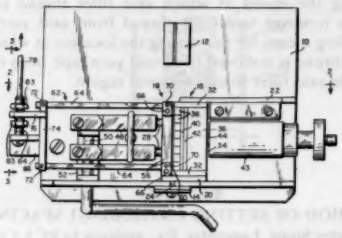
h. permanently fixing the cathode at said predetermined spacing with respect to said G1 grid; and

i. removing the moisture from said cathode thereby causing said cathode to return to its non-conductive state.

4,015,316
COMBINATION TENSION AND SLUB CATCHING DEVICE

Samuel L. Abbott, Wilton, N.H., assignor to Abbott Machine Co., Inc., Wilton, N.H.

Continuation of Ser. No. 466,983, May 6, 1974, abandoned. This application Oct. 1, 1975, Ser. No. 618,475
Int. Cl.² D01H 13/22; B65H 63/06
U.S. Cl. 28—64 2 Claims



1. In a yarn processing machine, a support, spaced yarn guides on the support for guiding the yarn along a predetermined path and a combination tension and slub catching device mounted on the support between the guides, comprising members mounted on the support at opposite sides of the yarn path defining a narrow elongate yarn passage, one of said members having a rigid surface and the other a yieldable surface such as to yield with respect to the rigid surface when an enlargement in the yarn passes between them, means for fixing the position of the member having the yieldable surface relative to the member having the rigid surface, means movable in response to variations in yarn tension, and means for moving the member having the rigid surface perpendicularly with respect to the member having the yieldable surface in response to said last means to maintain a constant tension, comprising spaced parallel links, means pivotally connecting the links at one end to the support for pivotal movement about spaced parallel fixed axes parallel to the face of the member having the rigid surface, means connecting the same ends to said member having the rigid surface for pivotal movement about spaced parallel axes parallel to the member having the rigid surface, means pivotally connecting the other ends of said links to a rigid part for pivotal movement about spaced parallel axes parallel to the face of the member having the rigid surface at a spacing corresponding to the spacing between the fixed axes and means connecting said part to said tension responsive means.

4,015,317
PROCESS FOR SIZING TEXTILE FIBERS FOR USE ON WATER JET LOOMS

Kenneth E. Johnsen, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

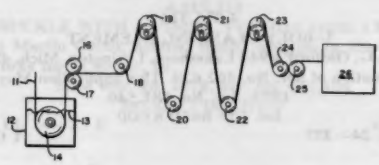
Filed Feb. 18, 1976, Ser. No. 658,972
Int. Cl.² D06C 29/00; D06L 1/14; C08F 220/04; D03D 47/32
U.S. Cl. 28—72.6 10 Claims

1. In a process for weaving textile fibers into fabric on a water jet loom wherein the fibers are sized prior to weaving, the improvement which comprises (a) depositing on the fibers a sizing amount of an inherently water dispersible copolymer of an aliphatic α-olefin and an ammoniated α, β-ethylenically unsaturated carboxylic acid, (b) drying the resulting textile fibers such that the copolymer forms a tough, adherent water-insensitive coating on the textile fibers, and (c) weaving the resulting sized fibers on a water jet loom.

4,015,318
METHOD OF SKEWING TWILL FABRIC TO AVOID LEG TWIST

Karin Hakanson, San Francisco, Calif., assignor to Levi Strauss & Co., San Francisco, Calif.

Division of Ser. No. 470,075, May 15, 1974, U.S. Pat. No. 3,959,826. This application Mar. 4, 1976, Ser. No. 663,962
Int. Cl.² D06C 3/00; D06H 3/12
U.S. Cl. 28—72 R 11 Claims

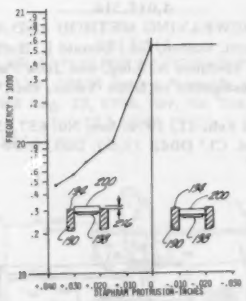


1. A method of manufacturing twill fabrics for use in the manufacture of products to be laundered comprising the steps of weaving the fabric having a given twill direction on a loom, and, during preparation and finishing, skewing the fabric so that its edge in the direction of the twill is advanced with respect to the opposite edge at least 3% of the width of the fabric, and maintaining the skew in the fabric through all subsequent finishing steps.

4,015,319
METHOD FOR MANUFACTURING AN ULTRASONIC TRANSDUCER

Walter E. Levine, Port Huron, Mich., assignor to Bindicator Company, Port Huron, Mich.

Filed Mar. 20, 1975, Ser. No. 560,245
Int. Cl.² H01L 41/22
U.S. Cl. 29—25.35 15 Claims

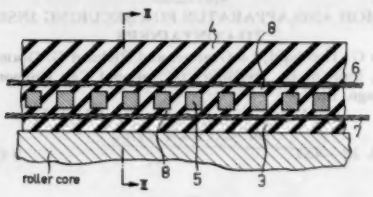


1. The method of constructing an ultrasonic transducer having a shell open at least at one end and a vibratory element having an element periphery and including a piezoelectric crystal, said method comprising the steps of locating said vibratory element over an open end of said shell coaxially therewith such that said vibratory element is mechanically coupled to said shell, and adjusting resonant frequency of said element and shell by varying the mechanical coupling between said vibratory element and said shell around the periphery of said element until the resonant frequency of the combined element and shell is equal to a preselected frequency.

4,015,320
ROLLER FOR THE PRESSURE TREATMENT OF WEBS OF GOODS

Werner Meckel, Nienhagen, and Werner Kilian, Wettbergen, both of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hannover, Germany

Filed May 17, 1976, Ser. No. 686,948
Claims priority, application Switzerland, May 15, 1975, 006242/75
Int. Cl.² B21B *31/08*
U.S. Cl. 29—130 **9 Claims**

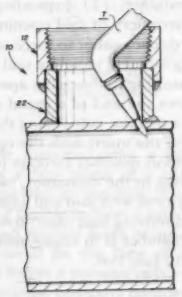


1. A roller for the pressure treatment of webs of goods, which comprises: a rigid roller core, a hose-shaped mantle of elastomeric material mounted on said core; and reinforcing inserts embedded in said mantle, said reinforcing inserts including a monofile coil of substantially non-extensible material extending over the length of said mantle, two layers of rectilinear thread-shaped strength carriers which extend substantially in the axial direction of the roller in mutually spaced parallel arrangement while being distributed in the circumferential direction of the roller and extending over the length of said roller and while being respectively located radially on opposite sides of said coil.

4,015,321
WELDED PIPE FITTING AND METHOD OF MAKING SAME

Melvin L. Witter, 9553 Atherton, Dallas, Tex. 75231

, Continuation-in-part of Ser. No. 535,283, Dec. 23, 1974, abandoned. This application June 14, 1976, Ser. No. 695,815
Int. Cl.² B21D *53/00*; F16L *41/02*
U.S. Cl. 29—157 T **11 Claims**



1. A relatively light-weight branch pipe fitting having a first end contoured for welding to a main pipe and its other end having internal threads for receiving a branch pipe, comprising:

a. a short section of relatively thick steel pipe having a generally uniform outer diameter and a bore of a given diameter, and said section having a first end with internal threads for receiving a branch pipe and its other end being counterbored to provide a finished seat, and the remaining wall alongside the counterbored portion having a residual thickness which lies within the range of about ¼ to ¾ of the original wall thickness, with the total length of said thick pipe section being not much more than that amount which is structurally required for providing threads to sealingly receive the end of a branch pipe;

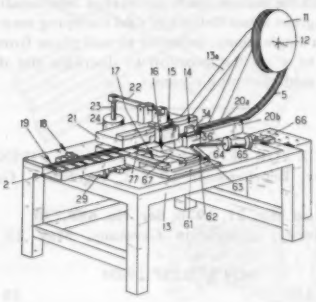
b. a short piece of relatively thin steel pipe having a generally uniform outer diameter which is less than that of the thick pipe section but greater than the bore of said section, with a first end of the thin pipe being configured to engage the counterbored seat in the thick section and its free end being contoured so as to permit it to fit flush against a round main pipe for efficient welding thereto, with the length of the thin pipe being approximately the same as the length of the thick pipe; and

c. the thick and thin pipes being engaged end-to-end with the first end of the thin pipe mating with the counterbored seat in the thick pipe, and there being a circumferential weld bead extending externally around the juncture of the two pipes to hold them rigidly together and to seal the fitting formed thereby, and the total length of the fitting being relatively short, whereby a cutting torch may be inserted internally of the fitting for cutting a hole in the main pipe after the fitting has been welded thereto.

4,015,322
APPARATUS FOR LOCATING CONNECTORS ONTO A CIRCUIT BOARD

Aimé Cabaud, Versailles, France, assignor to Comatel - Comptoir European de Materiel Electronique, Issy-Les-Moulineaux, France

Filed June 3, 1976, Ser. No. 692,483
Int. Cl.² H01K *43/00*
U.S. Cl. 29—739 **15 Claims**



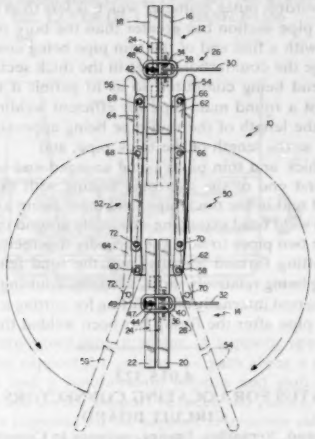
1. Apparatus for locating connectors onto a circuit board, said connectors each having first and second opposed end portions, each of said first end portions being intended for insertion into a printed circuit or for soldered connection to a conductor, and each of said second end portions comprising a clamp said connectors being arranged in a strip by first connecting means interconnecting the connectors at their first end portions, and second connecting means interconnecting the connectors adjacent their second end portions, said apparatus comprising a frame, a reel for said strip of connectors, support means for supporting the said reel an the frame, means defining a guide path for the strip as it is unwound from the reel, means for indexing the strip stepwise along the guide path, first cutting means for cutting a portion of the strip longitudinally adjacent the clamps whereby to separate the adjacent connectors from the second connecting means, means for gauging the clamps of the connectors of a portion of the strip, means for inserting a circuit board into the gauged clamps of the connectors of the strip, second cutting means for cutting the first connecting means transversely, and means for discharging from the apparatus circuit boards provided with said connectors.

4,015,323

PIPE MATING TOOL

George William Topper, P. O. Box 9, Safford, Ariz. 85546

Filed May 10, 1976, Ser. No. 685,021
Int. Cl.² B23P *19/04*
U.S. Cl. 29—237 8 Claims



1. A tool for mating two pipes comprising:

a pair of clamping means, each holding one of said pipes, the axial length of said clamping means being greater than the diameter of said pipe; and

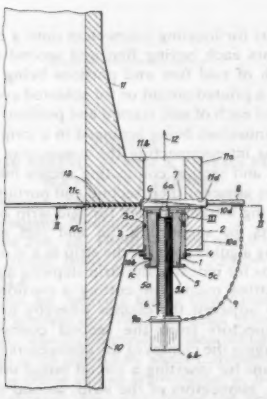
a pair of linking means, each connected one hundred and eighty degrees apart to both of said clamping means so as to be in a single plane, movable in said plane from a first position to a second position to decrease the distance between said clamping means.

4,015,324

DEVICE FOR SEPARATING FLANGE PIPES

Arnold Lutter, Bruckenkopf 10 1/2, Ingolstadt, Germany (8070)

Filed May 21, 1976, Ser. No. 688,730
Claims priority, application Germany, May 23, 1975, 2522817
Int. Cl.² B23P *19/04*
U.S. Cl. 29—239 10 Claims



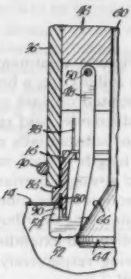
1. A device for separating the flanges of a pipe joint wherein a pair of flanges are spacedly juxtaposed and at least one of the flanges is provided with a bore, said device comprising a spreadable sleeve receivable in said bore, an internally threaded core member received in said sleeve and axially displaceable relative thereto for spreading said sleeve against the wall of said bore to anchor said sleeve in said bore, a plate receivable between said flanges, and a screw threaded into said core member and adapted to bear against said plate for pressing said plate against the other of said flanges while simultaneously displacing said sleeve and said core relatively, thereby spreading said flanges apart.

4,015,325

METHOD AND APPARATUS FOR SECURING INSERTS TO CONTAINERS

Marvin G. Theobald, La Grange, and Richard G. Olson, Chicago, both of Ill., assignors to National Can Corporation, Chicago, Ill.

Filed Mar. 29, 1976, Ser. No. 671,541
Int. Cl.² B23P *11/02*
U.S. Cl. 29—451 8 Claims



1. Apparatus for assembling a nonmetallic apertured insert onto a rim extending from the end panel of a metal container and surrounding an opening therein, comprising: support means for supporting said container, a first member for gripping said insert, a second member adapter to pass through the aperture in said insert, said second member having expansible means for extending beyond the periphery of said opening, and drive means for (1) moving said second member relative to said first member to pass said second member through the aperture of an insert gripped by said first member and the opening of the container, (2) expanding said expansible means beyond the periphery of said opening, and (3) moving said members towards each other to force said insert onto said rim while supporting said end panel by said expansible means.

7. A method of inserting nonmetallic apertured inserts onto a rim extending above the end of a metal container and surrounding an opening therein, comprising the steps of gripping an insert and aligning the insert with the opening in said container, passing a support member through the aperture in said insert and the opening in the container, moving said support member into engagement with said end adjacent the periphery of said opening, and moving said insert toward said container while said support member is in engagement with said end to force said insert onto said rim.

4,015,326

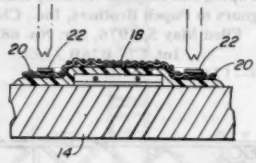
METHOD OF MOUNTING A STRAIN GAGE TO A SURFACE

Given A. Brewer, Marion, Mass., assignor to Brewer Engineering Laboratories, Inc., Marion, Mass.

Division of Ser. No. 550,516, Feb. 18, 1975, U.S. Pat. No. 3,940,730. This application Dec. 5, 1975, Ser. No. 637,888
Int. Cl.² B23P *3/00*
U.S. Cl. 29—460 3 Claims

1. The method of attaching a strain-deformable resistance wire strain gage to a surface of a metallic structure in which strain is to be monitored, comprising the following steps:

a. cementing said strain gage to said structure surface
b. placing over said strain gage a protective barrier layer of curable silicone plastic in an uncured state, completely covering the exposed surface of said strain gage and extending therebeyond over a portion of said structure surface,
c. placing over said silicone plastic barrer layer an apertured metallic overlay member covering that portion of said barrier layer that covers said strain gage and providing flange portions adjacent thereto
d. placing a sheet metal strip over said flange portions



e. welding said sheet metal strip through said apertured metallic overlay member and through said uncured protective barrier layer to said surface of said structure by pressing at least a part of said sheet metal strip into conductive contact with said flange portions and with said underlying structure surface and causing an electric current to flow through said part to said surface

said silicone plastic protective barrier being thereafter cured by exposure to a curing medium through said apertured metallic overlay member to provide a void-free seal around said welds and said gage.

4,015,327

METHOD OF MAKING A DECORATIVE STEREO SPEAKER ENCLOSURE

Peter McCarthy, Weston, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Mar. 26, 1976, Ser. No. 670,627
Int. Cl.² B23P *3/00*, *19/04*
U.S. Cl. 29—460 **9 Claims**

1. A method for manufacturing a decorative enclosure comprising making a face mask of a person by applying a liquid polymeric material to the face of a person, said polymeric material being fusible to form a substantially continuous flexible film at about human body temperature, maintaining said polymeric material on the face of a person until said polymeric material forms a substantially continuous cast film having three-dimensional contours conforming to the surface it is applied to, removing said substantially continuous film and filling said contours with a pourable material that is capable of hardening to form a casting embedding a hollow frame in said pourable material at the base of said casting to obtain a casting having said frame secured to the base thereof, mounting a sound transducer in said frame.

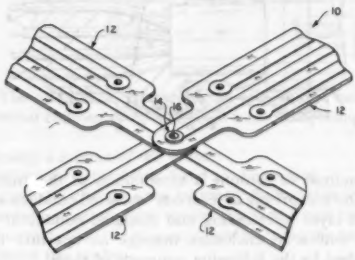
6. A method for manufacturing a decorative loud speaker enclosure comprising making a face mask of a person by applying a release agent to the face of a person applying a liquid polymeric material to such face of a person, said polymeric material being fusable to form a substantially continuous flexible film at about human body temperature, maintaining said polymeric material on the face of a person until said polymeric material forms a substantially continuous cast film having three-dimensional contours conforming to the surface it was applied to, removing said substantially continuous film and filling said contours with a pourable material that is capable of hardening in order to form a casting, mounting said film in a base embedding a hollow frame in said pourable material at the neck of said casting to obtain a three-dimensional casting having said frame secured to the base thereof to obtain a three-dimensional casting having said frame secured to the base thereof, securing a loud speaker comprising a sound transducer in said frame, coating said casting with a plastic material, decorating said casting which has been coated with colors to duplicate the facial features from which said film was cast.

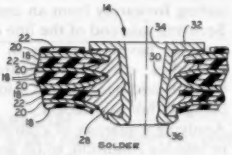
4,015,328

MULTILAYERED CIRCUIT ASSEMBLY INCLUDING AN EYELET FOR MAKING WELDABLE CONNECTIONS AND A METHOD OF MAKING SAID ASSEMBLY

Cletus G. McDonough, 200 Elm Tree Lane, Elmhurst, Ill. 60126

Filed June 2, 1975, Ser. No. 582,735
Int. Cl.² H05K *1/04*
U.S. Cl. 29—625 **4 Claims**





1. A method of making a multilayered circuit assembly from a plurality of flat, flexible circuit elements, each circuit element including a substrate having conductive means defining an electrical path of travel formed between a base layer made of insulation material and a cover layer made of insulation material, each circuit element having a connecting station associated with the conductive means, said method comprising the steps of:

forming the conductive means on the base layer of each circuit element;
punching a first opening through said conductive means and base layer at a connecting station of each circuit element;
soldering the connecting station of each circuit element so that a solid solder pad fills said first opening whereby said solder electrically contacts said conductive means;
punching a second opening through the cover layer of each circuit element;
securing the cover layer of each circuit element over the base layer and conductive means so that said first opening is generally concentric with said second opening;

punching a third opening in each circuit element through said solder pad, said third opening being smaller than and generally concentric with said first and second openings, the interior of said third opening being defined by the remaining solder;

stacking a plurality of punched and soldered circuit elements on top of one another so that the third openings of each are generally concentric;

inserting terminal means into the third openings of the stacked circuit elements so that a portion thereof contacts the solder; and

staking said terminal means so that the outer surface thereof forms a cold weld interference fit against the solder.

4,015,329
TERMINATION OF ELECTRIC CABLES

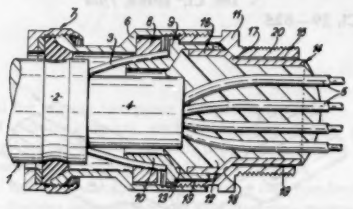
John Blundell Hutchison, "Europa", Liverpool Road, Formby, Merseyside, England

Filed Dec. 16, 1975, Ser. No. 641,343

Claims priority, application United Kingdom, Dec. 20, 1974, 55233/74

Int. Cl.² H02G *3/06, 15/04, 1/14*

U.S. Cl. 29—628 **18 Claims**



1. A method of forming a termination at the end of an electric line comprising at least one insulated conductor and a protective layer surrounding said insulated conductor where said line enters an enclosure through an aperture therein distinguished by the following sequence of steps:

1. Preparing said end of the line with said conductor projecting forwardly from an end of said protective layer;
2. Securing said end of the line in a first annular terminator member having a recess in its forwardly-directed face around a passage therethrough, said line extending through said passage and said end of the protective layer being within said recess;
3. Applying a quantity of a hardenable compound, in a pasty or viscous condition, to fill and stand proud of said recess and to adhere to said line within said recess;
4. Assembling a second annular terminator member, having a recess in its rearwardly-directed face, with said first terminator member to enclose said compound to an extent sufficient to allow generation of pressure in said compound;
5. Drawing said first terminator member and said second terminator member together by means of a pair of further annular terminator members before said compound has hardened to press said compound into firm contact with said line, and
6. Securing a said further annular terminator member by mechanically engaging same in said aperture in the enclosure.

10. A terminator for an electric line comprising a first annular terminator member with a passage for said line; securing means for securing said line to said first annular terminator member; a second annular terminator member telescopically engageable at its rear end with the front end of said first annular terminator member, and means including a pair of further annular terminator members for drawing said first and second annular terminator members towards one another, said first annular terminator member having a recess in its front face surrounding said passage and said second annular terminator member having a recess in its rear face to form with said recess in said first annular terminator member a compound chamber.

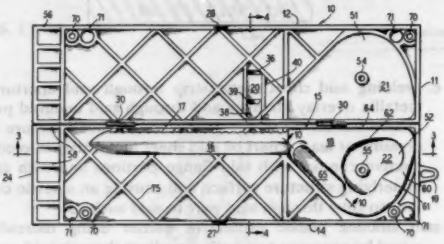
4,015,330
CUTTING BOARD CASE AND KNIFE SET

Samuel J. Popeil, and Lorenzo Anthony Ruiz, both of Chicago, Ill., assignors to Popeil Brothers, Inc., Chicago, Ill.

Filed May 5, 1976, Ser. No. 683,479

Int. Cl.² B26B *11/00*

U.S. Cl. 30—124 **10 Claims**



1. A cutting board case and knife set comprising, in combination,

a cutting board portion having hinged opposed halves,

a knife handle recess within said halves,

a cutting surface opposed to said recesses,

a knife having a blade portion and a handle portion,

said handle having a configuration complimentary to the handle recess,

releasable lock means for holding both halves together when encasing said knife,

and latch means for securing said halves when opened in a cutting board configuration,

whereby, when folded by its hinge means, the cutting board halves encase the knife and shield the same.

4,015,331
DOMESTIC OR TRADESMAN'S KNIFE

Karl Heinz Balke, No. 4a, Schubertstrasse, Solingen 19, Germany

Filed Feb. 9, 1976, Ser. No. 656,455

Claims priority, application Germany, Feb. 15, 1975, 2506406

Int. Cl.² B26B *9/02*

U.S. Cl. 30—355 **4 Claims**

1. A knife for cutting food, said knife consisting essentially of:

a. a handle and a blade,

b. said blade including a plurality of teeth located in an ordered disposition along at least one edge thereof;

c. said ordered disposition of teeth including a set of two rows of cutting teeth and a third row of intermediate cutting teeth being located between each set of two rows of cutting teeth;

d. said blade having two smooth opposing faces with each row of said set of two rows of cutting teeth being ground off alternately on opposite sides of the blade to form a cutting edge within the plane of each of the smooth faces of the blade;

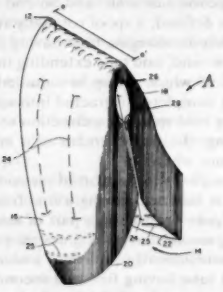
e. said third row of intermediate cutting teeth being ground

off from both faces to form a point on each third row at a location intermediate said two faces of the blade.

4,015,332
CROWN FORM AND METHOD

John E. Manne, 64 Delmar Place, Delmar, N.Y. 12054

Filed Sept. 23, 1975, Ser. No. 615,914
Int. Cl.² A61C *5/08*
U.S. Cl. 32—12 **12 Claims**



1. A dental crown form, which comprises;

a tubular shell corresponding generally in configuration and dimension to a natural tooth, fabricated from a flexible, synthetic, polymeric resin and having

i. a closed first end, the exterior thereof defining an occlusal surface corresponding in configuration and dimension to the occlusal surface of a natural tooth;

ii. a restricted, open second end which is festooned in a contour to correspond generally to the cervical line of a natural tooth;

iii. sidewalls flaring outwardly from said open second end and integral with said closed first end, said sidewalls corresponding in configuration and dimension to the mesial, distal, lingual and buccal surfaces, respectively, of a natural tooth; and

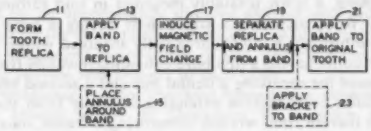
iv. means for fluid communication between the interior and the exterior of said shell, in the sidewall at points on the surfaces corresponding to said mesial and said distal surfaces; said sidewall having a plurality of slits therein, at least two of which are positioned in surfaces opposite to each other, said slits being substantially uniform in width throughout their length and originating at the open second end and terminating at a point in the sidewall;

provided that when said shell corresponds to the configuration and dimension of a tooth selected from the group consisting of a pre-molar, a canine and an incisor, said surfaces opposite each other are the mesial and distal surfaces and when said shell corresponds in configuration and dimension to a molar tooth, said surfaces opposite to each other are the lingual and buccal surfaces, respectively.

4,015,333
ORTHODONTIC BAND FORMING METHOD AND APPARATUS

Eugene L. Dellinger, 1326 Old Lantern Trail, Fort Wayne, Ind. 46825, and Robert J. Loubier, 5122 Chippewa Court, Fort Wayne, Ind. 46804

Filed Oct. 22, 1975, Ser. No. 624,951
Int. Cl.² A61C *7/00*
U.S. Cl. 32—14 A **12 Claims**



1. The method of conforming an orthodontic band to thee peripheral contour of an individual tooth comprising the steps of:

forming a replica of the tooth;

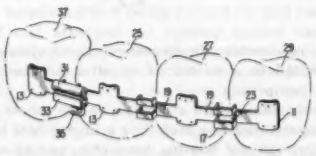
applying an orthodontic band to the replica;

and rapidly changing the magnetic field within the band to induce a current flow around the band which current flow interacts with the magnetic field to crimp the band closely about the replica.

4,015,334
POSTERIOR DIRECT BOND ORTHODONTIC UNIT SEGMENT

Dan Moss, 247 Ridge Road, Cedar City, Utah 84720

Filed Oct. 15, 1975, Ser. No. 622,604
Int. Cl.² A61C *7/00*
U.S. Cl. 32—14 A **16 Claims**



1. An orthodontic bracket comprising:

a. an elongated section of metal;

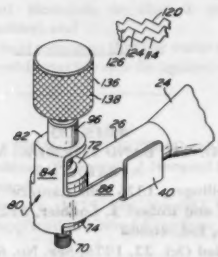
b. a plurality of contoured surfaces formed in said elongated section of metal, each of said surfaces being respectively adapted to be attached to the buccal surface of a different tooth of a patient undergoing orthodontic treatment; and

c. at least one attachment means which is adapted for attaching an archwire to said elongated section of metal.

4,015,335
COLLET WRENCH

John E. Nash, Downingtown, and Trevor D. Reader, King of Prussia, both of Pa., assignors to Star Dental Manufacturing Co., Inc., West Conshohocken, Pa.

Division of Ser. No. 496,604, Aug. 12, 1974, Pat. No. 3,960,039.
This application Feb. 24, 1976, Ser. No. 660,896
Int. Cl.² A61C 1/10
U.S. Cl. 32—27 7 Claims

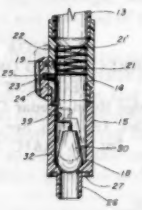


1. In combination a turbine driven dental handpiece and a collet wrench therefor, said handpiece comprising a turbine housing, a rotor rotatably mounted in said turbine housing, said rotor including a rotor shaft having a bore extending therethrough, a collet threadedly received within said bore, said collet having a first bore extending inwardly from one end thereof for receiving a dental bur and a second bore of non-circular cross-section extending inwardly from the opposite end thereof, said wrench comprising a frame, means on said frame for preventing the rotation of said rotor shaft, and means on said wrench for rotating said collet relative to said rotor shaft, said collet-rotating means comprising a shaft having an end of non-circular cross-section received in said second bore of said collet, means for rotating said shaft to threadedly advance said collet within said rotor shaft, and means to prevent further rotation of said shaft after a predetermined rotational force has been applied to said collet.

4,015,336
VALVE FOR AN ORAL EVACUATOR SYSTEM

W. Grant Johnson, 717 E. Chapman, Orange, Calif. 92007

Filed July 1, 1975, Ser. No. 592,140
Int. Cl.² A61C 17/04
U.S. Cl. 32—33 7 Claims



1. A valve structure for an oral evacuator system adapted to be connected to a source of negative pressure, said valve structure comprising:

a member adapted for contact with the mouth;

an elongated housing including a lingitudinal bore extending through said housing connecting to said member at its distal end and adapted to connect to source of negative pressure at its proximal end, having a valve seat formed by a reduced diameter portion of said bore, and a slot extending through said housing to said bore and lonitudinally of said housing;

a valve member moveable distally of said source of negative pressure in said bore for abutting engagement with said valve seat to prevent passage of flowable materials therebetween;

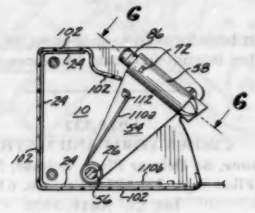
a spring connected to said housing and to said valve member for biasing said valve member into abutting engagement with said valve seat, said spring including an offset portion extending outwardly through said slot; and

a manually operable member exteriorly of said housing and connected to said offset spring portion remotely of said valve member for moving said offset spring portion in said slot and compressing said spring, whereby said valve member moves out of engagement with said valve seat to permit passage of flowable materials therebetween, said operable member being adapted to substantially seal said slot when said spring is compressed.

4,015,337
COMBINED TAPE MEASURE AND MARKING DEVICE

James A. Taylor, 12721 Harbor Blvd., Garden Grove, Calif. 92640

Filed June 7, 1976, Ser. No. 693,300
Int. Cl.² G01B 3/10; B43L 9/04
U.S. Cl. 33—138 5 Claims



1. A tape measure of the type that includes a housing having first and second side walls and an end wall in which a transverse slit is defined, a spool rotatably supported in said housing on which an elongate tape having measuring graduations thereon is wound, said tape extending through said slit, and on a free end of which a stop is mounted to prevent said tape from being completely retracted into said housing, and means for rotating said spool in a direction to retract said tape into said housing, the improvement of a marking device on said tape measure wherein:

a. an arm pivotally supported on said side wall and parallel thereto, said arm having a first free portion, and a transverse pointer forming a part of said free end portion;

b. spring means that at all times tend to pivot said arm from a first downward position to a second upward position;

c. a first tube having first and second open ends, said tube being mounted on said first end portion of said arm and substantially normal relative to the longitudinal axis of said arm;

d. a marking quill assembly that includes a cylindrical body having first and second ends, an elongate marking tip extending from said first end of said body, and an outwardly extending cylindrical collar on said cylindrical body adjacent said second end thereof;

e. a second tube that occupies a fixed position in said first tube, said second tube having a first open end and a resilient slit, closed second end portion that projects outwardly through said first end of said first tube, and a transverse body shoulder inside said second tube intermediate said first open end and second closed end thereof;

f. a compressed helical spring disposed in said tube that encircles said marking quill assembly and has one end in contact with said collar and the other end in engagement with said body shoulder;

g. an elongate button slidably movable in said second tube adjacent said first end thereof and projecting outwardly therefrom; and

h. stop means that prevent said helical spring from moving said button outwardly from said second tube, with said device when said arm is pivoted to said first position with

said pointer transversely aligned with a desired graduation on said tape, permitting a mark to be made that is transversely aligned with said desired graduation when said button is forced downwardly to move said marking tip longitudinally through said second end portion of said second tube to contact a surface on which said mark is desired to be made.

4,015,338

METHOD AND APPARATUS FOR CONTROL MEASUREMENT OF A MOTOR VEHICLE FRAME AND OR AGGREGATES CONNECTED THERETO

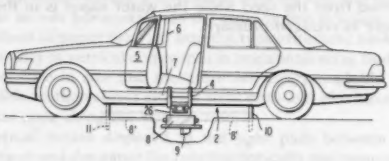
Lutz Kunze, Sindelfingen; Kurt Knapp, Neuhausen, and Klaus Brammer, Stuttgart, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Aug. 28, 1974, Ser. No. 501,356

Claims priority, application Germany, Aug. 28, 1973, 2343270

Int. Cl.² G01C *15/12*

U.S. Cl. 33—228 **64 Claims**



1. A method for carrying out control measurements of a measurement object, the measurement object having at least one reference measuring axis, the method comprising the steps of:

mounting a guide means so as to extend transversely of the reference measuring axis

mounting a single light source for selective displacement on said guide means;

selecting a plurality of selected measuring control points on the measuring object;

placing plumb line rulers having measurement control values thereon at the selected measuring control points of the measuring object;

transmitting at least one light beam from the single light source in a direction substantially parallel to the reference measuring axis of the measurement object;

selectively displacing the single light source on said guide means to align said at least one light beam with the respective plumb line rulers;

determining a first coordinate of the measuring object by measuring the displacement of the single light source means along said guide means;

determining a second coordinate of the measurement object by measuring the distance between the light source and the respective plumb line means; and

determining a third coordinate of the measuring object by measuring the distance between a control measuring value on the plumb line ruler and the point at which the light beam strikes the plumb line ruler.

4,015,339

MEASURING TOOL FOR FRAMEWORKS

Torgny William Hörvallius, Gavle, Sweden, assignor to Aktiebolaget SAMEFA, Stockholm, Sweden

Filed Nov. 3, 1975, Ser. No. 628,608

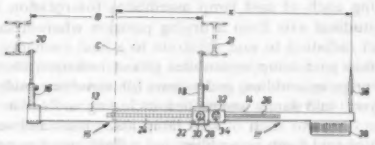
Int. Cl.² G01B *5/25, 11/27*

U.S. Cl. 33—288 **13 Claims**

1. In a measuring tool for checking frameworks, especially a vehicle chassis frame, by illustrating the position and straightness of the frame centreline in a position offset to the frame, the tool including a fixed part and a movable part, the fixed part including a suspended part comprising a bar portion and holders of which at least one is mounted for movement along the bar portion, and by which the suspended part is arranged to be suspended in a fixed position between two opposing sides of the frame to be checked, the movable part of the measuring tool including an indicator part comprising a sliding portion mounted for longitudinal movement with respect to the bar portion of the suspended part, the improvement comprised in that:

the suspended part and indicator part of the measuring tool are each provided with a length scale formed with uniform graduations between the scale markings, an index fixed with respect to the movable holder, said scale of said suspended part being formed on said bar portion thereof and arranged for reading against said index, thereby reflecting alterations in the distance between the sides of the frame being checked and consequently alterations in the position of the frame centreline, a second index fixed with respect to said suspended part, said scale of said indicator part being formed on said sliding portion thereof and arranged for reading against said second index, the scale graduations of said bar portion scale being twice as large as those of said sliding portion scale, whereby said alteration in frame sides distance and frame centreline position, changing said bar portion scale reading by a given number of graduations, can be compensated by an appropriately directed shift of said sliding portion by the same number of graduations of its scale, to leave unchanged the positions of said centreline and the sliding portion with respect to each other.

6. In a measuring tool for checking frameworks, especially a vehicle chassis frame, by illustrating the position and straightness of the frame centreline in a position offset from said frame, such tool including a fixed part and a movable part, said fixed part including a suspended part comprising a bar portion and holders of which at least one is mounted for movement along said bar portion, and by which said suspended part is arranged to be suspended in a fixed position between two opposing sides of said frame to be checked, said movable part of said measuring tool including an indicator part comprising a sliding portion mounted for longitudinal movement with respect to said bar portion of said suspended part, the improvement comprised in that:



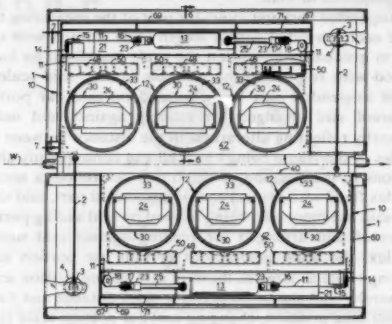
said suspended part and said indicator part of said measuring tool are each provided with a length scale formed with uniform graduations between the scale markings, an index fixed with respect to said movable holder, the scale of said suspended part being formed on said bar portion thereof and arranged for reading against said index, thereby reflecting alterations in the distance between the sides of said frame being checked and consequently alterations in the position of the frame centreline, a second index also fixed with respect to said movable holder, the scale of said indicator part being formed on said sliding portion thereof and arranged for reading against said second index, the scale graduations of said bar portion scale being twice as large as those of said sliding portion scale, whereby a said alteration in frame sides distance and frame centreline position changing said bar portion scale reading by a given number of graduations can be compensated by an appropriately directed shift of said sliding portion by the same number of graduations of its scale, to leave unchanged the positions of said centreline and sliding portion with respect to each other.

4,015,340

ULTRAVIOLET DRYING APPARATUS

Robert E. Treleven, Green Bay, Wis., assignor to TEC Systems, Inc., DePerr, Wis.

Filed Aug. 20, 1975, Ser. No. 606,295
Int. Cl.² F26B 3/28
U.S. Cl. 34—4 **16 Claims**



1. Ultraviolet radiating means for curing and drying a substrate comprising: a housing means, a plurality of ultraviolet elongated lamp assemblies each having a longitudinal axis and supported in parallel relation in said housing for selectively radiating ultraviolet radiation against said substrate, an elongated heat exchanger supported in said housing and adjacent said lamp assemblies, said housing including means for supporting each of said lamp assemblies for rotation about its longitudinal axis from a drying position wherein said lamps direct radiation to said substrate to a heat exchange position wherein said lamp assemblies direct radiation to said heat exchange assemblies, and means for simultaneously rotating each of said lamp assemblies including a flexible member wound around each of said lamp assemblies and secured to each of said lamp assemblies and a fluid motor supported by said housing, said fluid motor including a reciprocable member having opposite ends, said flexible member having opposite ends, one of said opposite ends of said flexible member being attached to an end of said reciprocable member for movement therewith and the other of said opposite ends of said flexible member being attached to the other end of said reciprocable member for movement therewith whereby activation of said fluid motor causes said flexible member to simultaneously rotate said lamp assemblies.

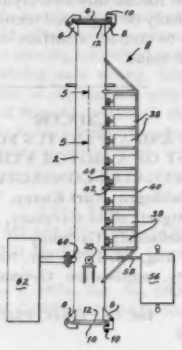
4,015,341

SEED DRYING PROCESS AND APPARATUS

Howard F. McKinney, Florissant; Nathan L. Higginbotham, Chesterfield, and Dick Q. Durant, Manchester, all of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Dec. 22, 1975, Ser. No. 643,507
Int. Cl.² F26B 3/28, 5/04
U.S. Cl. 34—4 **13 Claims**

1. A process for drying seed without significantly impairing the germinating qualities of the seed, said process comprising: placing the seed in an atmosphere of substantially reduced pressure; subjecting the seed to microwave energy while maintaining the individual seeds in a generally quiescent condition with respect to one another, the seed being subjected to the microwave energy while the seed is within the atmosphere of reduced pressure so as to convert liquid water within the seed to water vapor which leaves the seed and enters the atmosphere of reduced pressure; and condensing the water vapor



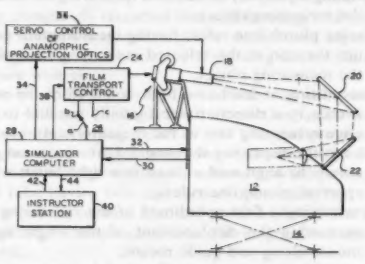
derived from the seed while the water vapor is in the atmosphere of reduced pressure.

4,015,342

FLEXIBLE VISUAL DISPLAY SYSTEM

Francis L. Masselle, Hallstead, Pa., assignor to The Singer Company, Binghamton, N.Y.

Filed May 7, 1973, Ser. No. 357,947
Int. Cl.² G09B 9/08
U.S. Cl. 35—12 N **5 Claims**



1. A visual simulation system for vehicle trainers comprising, in combination:

a student station having simulated controls appropriate to the vehicle for providing output signals representative of the actuation of said simulated controls;

a cine film strip carrying a first motion picture sequence recorded on selected frames uniformly spaced from each other by at least one intermediate frame and a second motion picture sequence recorded on intermediate frames spaced from one another by the same number of frames as said selected frames;

a cine projector for displaying said cine film strip including film transport means adjustable to advance said cine film in increments of a single or multiple frames at a time; and

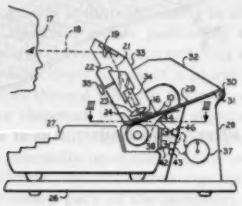
means responsive to selected ones of said output signals for selectively adjusting the film transport means to change momentarily between single and multiple frame film advance during operation of the projector so that a selection can be made as to which of the motion picture sequences is displayed.

4,015,343

TESTING APPARATUS

Robert M. Gottsdanker, 100 E. Constance, Santa Barbara, Calif. 93105

Filed Mar. 29, 1976, Ser. No. 671,244
Int. Cl.² G09B *19/00*
U.S. Cl. 35—22 R **6 Claims**



1. Apparatus for testing the visual-motor responses of human subjects who operate a keyboard device comprising:

a. a typewriter having a horizontal striking line and a part that moves horizontally as the striking line is typed;

b. a sheet of paper inserted into the typewriter and having a plurality of vertical commands in horizontal array that are miniature in size and therefore not easily readable, but visible to the subject along a sight path and also having a clear area along the striking line;

c. optical means disposed in the sight path between the subject and the paper for rotating optically the commands so that they appear to the subject to be horizontal;

d. a magnifier disposed in the sight path to enlarge the commands so that they are easily readable;

e. a slitted mask disposed in the sight path to limit the number of commands visible to the subject;

f. and means supporting said mask and connected to one of said typewriter or moving part of the typewriter, to obtain relative movement of the mask and paper as the typing progresses;

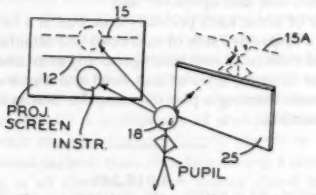
whereby new commands are revealed to the subject as responses to commands are typed.

4,015,344

AUDIO VISUAL TEACHING METHOD AND APPARATUS

Herbert Michaels, 316 W. 79th St., Apt. 1 FW, New York, N.Y. 10024; William Stanton, 29 Fairview Ave., Great Neck, N.Y. 11023, and Edward Roll, Laurelton Road, Mount Kisco, N.Y. 10549

Continuation of Ser. No. 230,240, Feb. 29, 1972, abandoned. This application Dec. 28, 1973, Ser. No. 429,152
Int. Cl.² A63B *69/00*
U.S. Cl. 35—29 R **6 Claims**



1. Apparatus for practicing a method for teaching physical arts and skills, such as, for example, dancing, which comprises:

a. establishing the active image of a performing instructor in a virtual optical plane;

b. simultaneously establishing in a similar virtual optical plane, the active performing image of a pupil imitating the action of the instructor; and

c. placing both virtual images in position for direct simultaneous viewing by the pupil while performing, to enable the pupil to observe both images for instructive comparison, comprising, in combination,

a photographic record of a main mirror in front of the performing instructor to show a front elevational mirror image of the instructor while performing;

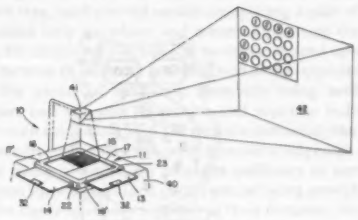
and an auxiliary mirror to be positioned to one side of a visual reproduction of said main mirror and image, to enable an observer, such as a pupil, to stand where he can see the main mirror image of said instructor, while also seeing his own performing image in the auxiliary mirror.

4,015,345

MULTIPLICATION LEARNING AID DEVICE

Howard E. Rice, Jr., 2684 Deming Blvd., Cheyenne, Wyo. 82001

Filed Dec. 17, 1975, Ser. No. 641,518
Int. Cl.² G09B *19/02*
U.S. Cl. 35—31 E **1 Claim**



1. A multiplication learning aid device for teaching multiplication tables and mentally reinforcing the concepts of multiplication to elementary school students, the device comprising, in combination:

a framework containing a multiplication display board provided with vertical and horizontal rows for transparent or translucent display of the numbers 1 through 9;

a series of translucent colored holes covered with colored translucent material with one each of the holes provided at each of the respective intersecting points of each of the numbers;

a bottom insert slidable into the framework to protect the device when not in use, and removable from the framework when in use;

vertical and horizontal inserts used to cover or uncover a combination of horizontal and vertical numbers with their corresponding number of colored holes to visually display the product result of a multiplicand and multiplier; and

the numbers and the series of colored holes for use in combination with an overhead projector to visually display the multiplication tables to elementary school students on a screen for use as a visual aid.

4,015,346

MACHINE FOR USE IN TEACHING THE MANNER IN WHICH A CLOCK INDICATES TIME

Toyotsugu Ogasawara, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed Nov. 24, 1975, Ser. No. 634,420
Int. Cl.² G09B *19/12*
U.S. Cl. 35—39 **9 Claims**

1. A machine for teaching the manner in which a clock having at least one rotary hand indicates time, which machine comprises:

a support,

a simulated clock face located on said support so that the front thereof is exposed, said clock face having a center,

a first shaft rotatably mounted with respect to said clock

face and extending through the center of said clock face from the front thereof to the back thereof,

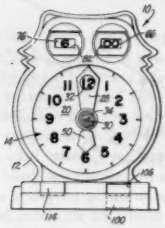
a second shaft rotatably mounted around said first mentioned shaft, said second shaft also extending through the center of said clock face from the front thereof to the back thereof,

a first simulated clock hand connected to said shaft so as to rotate therewith, said hand being located in front of said clock face and extending generally parallel to said clock face,

a second simulated clock hand, said second hand being connected to said second shaft so as to rotate therewith, said second hand also being located in front of said clock face and extending generally parallel to said clock face,

readout means for indicating a plurality of numerical values corresponding to positions of said hand relative to said clock face movably mounted on said support so as to be capable of being moved to a plurality of positions corresponding to various positions of said hand relative to said clock face,

said readout means having parts, one of said parts for indicating positions of said first mentioned hand relative to



said clock face and the second of said parts for indicating positions of said second hand relative to said clock face,

mechanical means for moving said readout means as said hand is moved, said mechanical means connecting said shaft and said readout means,

said mechanical means includes gear means for transmitting motion coupling said first mentioned shaft and said second shaft so that said shafts can be rotated in synchronism with one another so as to provide a single mechanical output and a single motion transmission means for transmitting rotation coupling one of said shafts and said readout means,

actuating means for causing rotation of at least one of said shafts,

display means for permitting a specific numerical value on said readout means to be visually inspected, said display means being located adjacent to said readout means,

cover means for covering the portion of said readout means capable of being visually inspected, said cover means being capable of being moved relative to said display means and said readout means so as to permit visual determination of a specific numerical value on said readout means.

4,015,347

INSOLES EFFECTIVE FOR CURING AND PREVENTING ATHLETE'S FOOT

Kazuyoshi Morishita, No. 20-C-305, Hinage-Aza-Toube, Chita, Aichi, and Nobuhiko Furukawa, No. 6-15, Yagumo 5-chome, Meguro, Tokyo, both of Japan

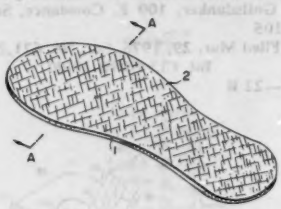
Filed Nov. 14, 1975, Ser. No. 631,854

Claims priority, application Japan, Dec. 28, 1974, 49-157492[U]; Sept. 1, 1975, 50-119217[U]

Int. Cl.² A43B *13/38*

U.S. Cl. 36—44 **7 Claims**

1. An insolve comprising a sheet of material having substantially the contour of a human foot or a portion of a human foot, said material comprising a moldable plastic having dispersed therein particles of a metal selected from the group



consisting of silver, alloys of silver, copper and alloys of copper.

4,015,348

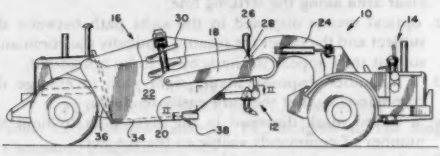
RIPPER ASSEMBLY FOR TRACTOR DRAWN SCRAPER

James E. Gee, Washington, and Robert N. Stedman, Chillicothe, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 30, 1975, Ser. No. 618,181

Int. Cl.² E02F *5/04*

U.S. Cl. 37—124 **6 Claims**



1. In an earth working machine which comprises a scraper having a bowl with a back, a bottom, two sides and a forward cutting edge, a spreader forward of said cutting edge and supported by forward extensions of said sides, a tractor forward of said spreader for pulling said scraper and means for raising and lowering a forward end of said scraper relative to said tractor, a ripper assembly which raises and lowers in fixed relation to said spreader and to said cutting edge on operation of said raising and lowering means comprising:

a beam suspended generally vertically downwardly from said spreader and generally forwardly from said bowl;

a plurality of ripper sockets extending laterally from said beam;

a plurality of ripper shanks held in said sockets;

a means for adjusting the vertical separation between said beam and said spreader;

a pair of telescoping means between said beam and said spreader pivotally attached to a respective one of said beam and said spreader; and

a pair of arms, each pivotally attached at a first end thereof to a respective side of said bowl and attached at a second end thereof to said beam generally at an end thereof, said pair of arms, sides of said bowl and a pair of telescoping means forming a pair of triangular braces for said ripper assembly.

4,015,349

CHANGEABLE MESSAGE HIGHWAY SIGN MACHINE

Samuel B. Dunne, Dixon, Ill., assignor to Fosco Fabricators, Inc., Dixon, Ill.

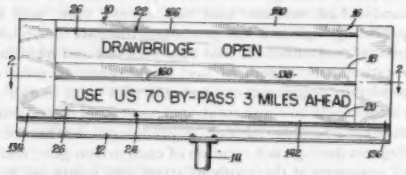
Continuation of Ser. No. 106,100, Jan. 13, 1971, abandoned. This application Feb. 25, 1974, Ser. No. 445,627

Int. Cl.³ G09F *11/10*

U.S. Cl. 40—33 **18 Claims**

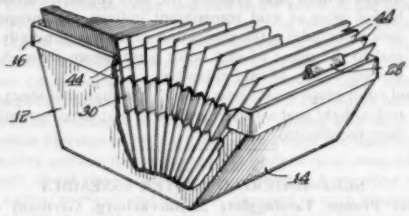
2. For displaying selectively to motorists any of a plurality of traffic meassages, a changeable message highway sign machine comprising a casing adapted to be mounted in an over-

head position proximate to a highway traffic lane to confront oncoming motorists, the motorist confronting side of said casing being shaped to form a vertical sign face, said casing defining in said sign face a message aperture, a message bearing rotor defining on the periphery thereof a plurality of message faces extending longitudinally along the rotor and being angularly spaced around the rotor, each message face being adapted to present lettering of a written message, said rotor being disposed rotatably within said casing in aligned relation to said message aperture, means journalling said rotor for rotation about the axis thereof, means coacting with said rotor to turn the rotor selectively to any of a plurality of message presenting positions thereof wherein the respective message faces thereon are disposed in viewing alignment with said message aperture to be displayed therethrough to oncoming motorists, a first internally open member on said casing extending along the lower edge of said message aperture in close proximity to the rotary path of the periphery of the rotor, heating element means extending along the interior of said first member to thermally preclude an icing bridgeover between the rotor and the lower edge of the message aperture, a second internally open member on the casing extending along the upper edge of said message aperture in close proximity to the rotary path of the rotor periphery, and heating element means extending along the interior of said second member to preclude an icing bridgeover between the rotor and the upper edge of the message aperture.



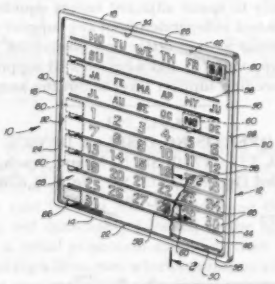
16. For displaying selectively to motorists any of a plurality of traffic messages, a changeable message highway sign machine, comprising a casing adapted to be mounted in a position proximate to a highway traffic lane to confront oncoming motorists, said casing having a motorist confronting sign face formed with a message aperture, a message bearing rotor disposed in said casing and having at least three peripheral message faces spaced at angular intervals around said rotor, means in said casing rotatably supporting said rotor for rotation behind said message aperture to bring said message faces successively into view through said message aperture, and powder indexing means for indexing said rotor to bring each message face in turn into view through said message aperture, said rotor having at least three substantially parallel longitudinal corner chords with a multiplicity of skeletal truss braces secured between the successive adjacent chords to form a three-dimensional skeletal truss structure having a strength to resist bending in all directions, each corner chord having a hollow cylindrical longitudinal body with a pair of substantially flat longitudinal flanges formed integrally with said body and projecting therefrom toward the two adjacent corner chords of said rotor, said skeletal braces being secured to said flanges and extending between the confronting flanges of the adjacent corner chords, and at least three thin flat longitudinal sign panels secured to an extending between the confronting flanges of the adjacent corner chords, said sign panels having said message faces thereon.

4,015,350
CARD FILE CONTROL
Rolf Zurwelle, Churchville, Md., assignor to Business Efficiency Aids, Inc., Skokie, Ill.
Continuation of Ser. No. 479,228, June 14, 1974, abandoned. This application Nov. 17, 1975, Ser. No. 632,890
Int. Cl.² G09D 1/00
U.S. Cl. 40—105.5 **5 Claims**



1. A card file comprising a tray structure, and control means for effecting selective fanned separation of cards and the like within said tray, said control means comprising a pair of elongated pleated strip members and means supporting the strip members for disposing the same at positions spaced upwardly from the bottom of said tray and disposed along opposite sides thereof, the pleats of said strip members being resiliently urged apart and adapted to receive and separate individual cards between said pleats with the pleats maintaining the cards in substantially parallel array and in transverse edgewise alignment and being of sufficient inherent resiliency to normally tend to open up with included cards, means being provided for holding the cards relatively together at their bottoms, whereby the cards are separated at their tops by said strip members under the resilient urging of said pleats sufficient to maintain the cards in one area selectively fanned without skewing thereof for ease of viewing relative to cards in another area of the tray.

4,015,351
PERPETUAL CALENDAR
Eli Sasson, 605 N. Bedford, Beverly Hills, Calif. 90210
Filed Feb. 23, 1976, Ser. No. 660,340
Int. Cl.² G09D 3/00
U.S. Cl. 40—110 **1 Claim**



1. A perpetual calendar comprising:

a base member including a marginal edge and a portion intermediate said marginal edge, and a plurality of horizontal parallel grooves formed in said portion;

an overlay of sheet material having an inner surface covering said portion of said base member capping said grooves, said overlay includes transparent indicia and said indicia is in overlying registry with said grooves of said base member and is arranged in columns and rows; and said overlay includes a plurality of horizontal slots

therethrough extending between the rows of indicia with a single slot in registry with a single groove;

color plate means corresponding in number to the number of said grooves and each is seated in one of said grooves for movement therein to be in registry behind selected ones of said indicia;

propelling means associated with said color plate means each including a portion projecting from said perpetual calendar for finger engagement to move said color plate means within said grooves for said registry behind selected ones of said transparent indicia; said propelling means includes a tab projection extending generally normal to the plane of said color plate means through said slot outwardly of said calendar;

said color plate means being visible through said sheet so as to highlight said selected indicia so that visual attention is directed thereto.

4,015,352
SELF-ADHERING LETTER ASSEMBLY

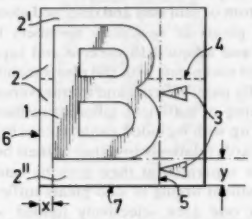
Dieter Prange, Lessingplatz 2, Bueckeburg, Germany 4967

Filed May 29, 1975, Ser. No. 581,729

Claims priority, application Germany, Mar. 8, 1975, 2510783

Int. Cl.² G09F *3/10*

U.S. Cl. 40—125 A 9 Claims



1. A self-adhering letter assembly comprising a removable support layer having an upper part and a lower part divisible along a line of perforation and a letter having an adhesive backing, said letter and said adhesive backing being disposed on and removably secured to one face of said support layer, and a portion of said letter being spaced inwardly a predetermined first distance from a left lateral edge of said support layer, at least one mark of relatively small size compared to said letters having an edge adjacent the right-hand side edge of the letter for forming a reference line alignable with the left edge of a next succeeding like support layer for another letter, thereby laterally to space adjacent letters equidistantly, said mark being formed independently of any support sheet and of the same material as said letter and positioned on said one face of said support layer and wherein said support layer and said next succeeding support layer about the same width.

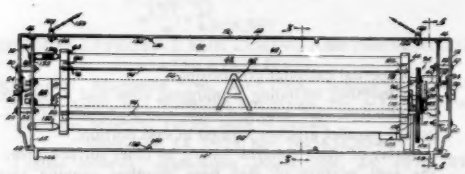
4,015,353
ADVERTISING DISPLAY DEVICE

Renato Zarfati, 251 - 174th St., N. Miami Beach, Fla. 33160

Filed Oct. 14, 1975, Ser. No. 621,650

Int. Cl.² G09F *11/02*

U.S. Cl. 40—77 9 Claims



1. A device for displaying a variety of indicia comprising:

a main housing comprised of top, bottom, back and opposed end walls defining an interior chamber with an open front;

a front bezel, fixed relative to said open front, and including a front opening of predetermined dimensions;

a fluorescent light tube extending longitudinally through said chamber in electrical connection with a pair of opposed end terminals, fixed relative to a pair of opposed end plates fixed within said chamber, adjacent the respective end walls, each of said vertical end plates is slidably engaged in aligned, transverse grooves in said top and bottom walls and is fixed to one of said end walls by nut and bolt means between said one end wall and said end plates;

a cylindrical indicia display assembly rotatably journaled on said fluorescent light tube in an axial relationship therewith, said indicia display assembly being comprised of a longitudinally extending translucent tubular member and a pair of opposed end closure caps;

a plurality of longitudinally extending strips in a fixed, parallel, spaced apart relation along the outer face of said translucent tubular member for removable reception, between each adjacent pair thereof, of a sheet provided with indicia;

a drive motor with a speed reducer carrying a drive gear engaged with a driven gear, said driven gear being rotatably journaled on the axis of said fluorescent light tube;

indexing means actuated by said driven gear to periodically, sequentially rotate the indicia sheets into registration with said bezel opening, said indexing means comprises a ratchet, providing a plurality of teeth, formed integral with one end cap of said cylindrical display assembly, a drum type cam fixed relative to said fluorescent tube and cylindrical display assembly, a spring loaded cam follower, in engagement with said cam, and a pawl fixed for like pivotal movement on opposed ends of a common pin journaled through said driven gear which is rotatably sandwiched between said ratchet and cam, said cam providing high and low portions to impart like relative, pivotal movements to said cam follower and pawl, upon rotational movement of said driven gear, to pivot said pawl into sequential engagement with each one of said ratchet teeth to cause rotational movement of said indicia display assembly through a predetermined number of degrees during each rotation of each driven gear, and out of engagement therewith to arrest said rotational movement during the balance of each rotation of said driven gear.

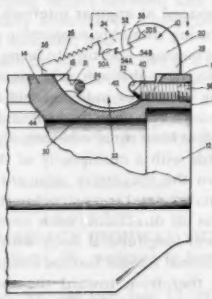
4,015,354
GUN SIGHT

Paul E. Brouthers, Monson, Mass., assignor to Dan Wesson Arms, Inc., Monson, Mass.

Filed Mar. 29, 1976, Ser. No. 671,355

Int. Cl.² F41G *1/02*

U.S. Cl. 42—1 S 9 Claims



1. In combination, a firearm barrel having a muzzle and a gun sight, means forming an elongated slot in the top of said barrel with elongated sidewalls extending in a direction lengthwise of the barrel from a point spaced from said muzzle, said gun sight having an exposed sighting section and a sup-

port section integral therewith, said exposed section extending from said slot, said support section having a dovetail shape with indentations defined by said dovetail extending toward opposite ends of said slot and with opposite walls of said support section engaging said sidewalls to secure said gun sight against lateral movement, means in said slot for engaging said indentation remote from said muzzle to secure said gun sight against movement away from said muzzle, and means defining an opening in said barrel extending from said muzzle to said slot in alignment with said indentation and securing means removably positioned in said opening to secure said gun sight against movement toward said muzzle and to permit disengagement of said gun sight and said barrel upon removal of said securing means from said barrel.

4,015,355

INCENDIARY PROJECTILE AND MANUAL LAUNCHER

Alois Schiessl, Bad Reichenhall, and Hartmut Krone, Bayrisch Gmain, both of Germany, assignors to Firma Buck K.G., Germany

Filed Mar. 14, 1975, Ser. No. 558,236

Claims priority, application Germany, Mar. 14, 1974, 2412346

Int. Cl.² F41F *27/00*

U.S. Cl. 42—1 F **28 Claims**

1. A hand fired projectile launcher comprising a handled launching barrel, a propellant charge, triggering means for igniting said propellant charge, and a projectile disposed in said barrel, said projectile being of relatively high weight in comparison to other components of said launcher, the improvement wherein said projectile comprises:

a casing formed of an easily deformable material capable of disintegrating along substantially its entire length in response to impact,

an incendiary charge disposed in said casing,

an explosive disintegrator charge disposed in said casing and being suitable to explosively disintegrate said casing upon ignition, and

a first charge including a glow and delaying composition arranged to:

be ignited to a burning condition by said propellant charge,

ignite said incendiary charge,

continue to burn for a predetermined period after ignition of said incendiary charge, and

thereafter ignite said disintegrator charge to disintegrate the casing.

4,015,356

REVOLVER CYLINDER FOR THE EJECTION OF RIMLESS CARTRIDGE CASES

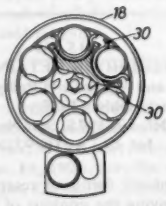
Gilbert Maillard, Montbeliard, France, assignor to Manufacture de Machines du Haut-Rhin S.A., Mulhouse Cedex, France

Filed June 10, 1975, Ser. No. 585,697

Claims priority, application France, June 11, 1974, 74.20125

Int. Cl.² F41C *15/00*

U.S. Cl. 42—68 **5 Claims**



1. A cylinder of a revolver having a plurality of chambers and provided with a mechanism for simultaneously ejecting a plurality of rimless cartridges therefrom, said mechanism comprising a collective ejector means provided with a head generally in the form of a disc presenting on its periphery a plurality of equally angularly spaced similar cutout portions adapted to the passage of cartridges therethrough, each cutout portion being essentially circular in form and being disposed in accurate alignment with a chamber of said plurality of chambers in the cylinder which receive the cartridges therewithin, the casings of said cartridges being flangeless and rimless but presenting an annular groove in the vicinity of the rear part of the cartridge disposed in the plane of the head of the ejector means, and cartridge retaining means disposed in the region of each cutout portion and adapted to engage within the annular groove in said cartridge, said retaining means cooperating with and engaging within such annular groove at the end of the introduction of the cartridges into the respective chambers in the revolver cylinder and until the complete ejection of the cartridges or casings, the head of the collective ejector means presents a peripheral groove which extends about the entire contour of the head provided with said cutout portions and which is disposed in such manner as to be located in the same plane as the annular groove in the rear part of the casings when the cartridges are fully inserted into the respective chambers in the revolver cylinder and the ejector means is retracted, said peripheral groove being adapted to receive the cartridge retaining means at the location of each cartridge at each cutout portion, said cartridge retaining means being elastic, such elastic retaining means being constituted by a plurality of generally U-shaped leaf springs which are of generally semi-circular form and which are adapted to engage in the annular groove in the rear end of a respective casing at two diametrically opposed zones.

4,015,357

FIREARM BOLT

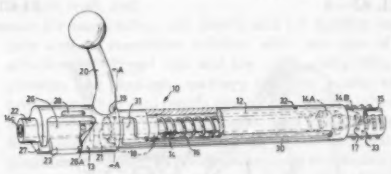
Lars Ake Vilhelm Andersson, Sandstensvagen 71, S-136 51 Handen, Sweden

Filed Aug. 11, 1975, Ser. No. 603,684

Claims priority, application Sweden, Aug. 13, 1974, 7410321

Int. Cl.² F41C *11/00*

U.S. Cl. 42—16 **3 Claims**



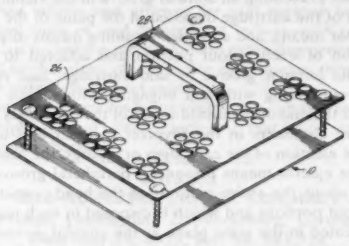
1. A bolt for a firearm, especially a rifle with bolt action loading having a receiver for the bolt, comprising a bolt body having a central bore, a striker rod slidably and rotatably mounted in said bore, a coil spring urging the striker rod forwardly, a nut detachably fastened to the rear end of the striker rod, a radial projection extending from said nut, said bolt body having a front part which comprises a bolt head with latches and a rear part which comprises a searing head with an aperture for guiding the radial projection from the nut on the rear end of the striker rod, a bolt lever detachably inserted in a sideways facing bore in said searing head, characterized in that the innermost part of the bolt lever is forked so as to embrace the striker rod on being inserted in the sideways facing bore, the front face of the forked part of the lever further having a cylindrical cavity and a cylindrical hollow body urged by the coil spring abutting its forward end face to press the rear portion of the cylindrical body into the cylindrical cavity, thus interlocking the bolt lever in its inserted position.

4,015,358

CARTRIDGE STORING AND LOADING DEVICE FOR A REVOLVER

Richard Wayne Amos, Arcadia, Calif., assignor to Van Zandt Precision Products, Inc., Azusa, Calif.

Filed Feb. 2, 1976, Ser. No. 654,090
Int. Cl.² F41C *27/00*
U.S. Cl. 42—87 **5 Claims**



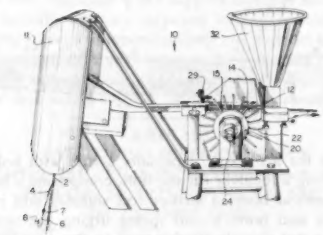
1. A fixture for storing and simplifying the loading of cartridges in the cartridge chamber of a revolver, comprising a flat frame plate, a flat cartridge supporting plate, guide members movably supporting the supporting plate from and in parallel relationship to the frame plate, the guide members permitting movement of the parallel plates toward each other, stop means for limiting the separation of the frame plate and supporting plate, and spring means urging the plates away from each other against the stop means, the supporting plate having a plurality of groups of holes for receiving the cartridge to be loaded, the holes in each group corresponding in size and arrangement to the cartridge chambers in the revolver to be loaded from the fixture.

4,015,359

HOOK BAITING MACHINE

Donald Andrews, P.O. Box 88, Topsail, Newfoundland, Canada

Filed July 18, 1975, Ser. No. 597,284
Int. Cl.² A01K *97/00*
U.S. Cl. 43—4 **11 Claims**



1. Apparatus for mechanically baiting fish hooks attached at spaced intervals by snoods to a long line comprising: guide means having a longitudinal axis, for receiving and circumscribing said line, snoods and eyes of the hooks to channel them longitudinally and unobstructedly through said apparatus while restricting them against lateral displacement from said guide means, said guide means comprising a longitudinal channel extending through said apparatus, at least one side of said channel having a parallel lateral clearance of sufficient width and depth to permit passage therethrough of the shank of each hook;

orienting and tensioning means laterally offset from said guide means beside a central portion thereof, which means comprises a moving spoke, to momentarily intercept each hook as it passes through the apparatus, the position and motion of said spoke being such that the shank and point of each intercepted hook is progressively rotatably and laterally oriented and such that the tension on the hook and associated snood is increased;

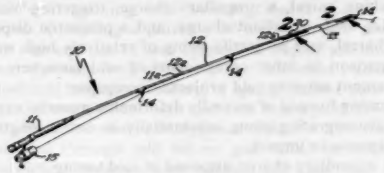
and a baiting chamber having an exit gate to hold bait within, positioned to receive the hook as it leaves said hook orienting and tensioning means, said spoke releasing said intercepted hook when the orientation of and tension on the hook and associated snood is such that the hook can securely impale said bait within said chamber, said impaled bait leaving said baiting chamber through said exit gate.

4,015,360

FIBERGLASS FISHING ROD WITH CARBON FILAMENT INSERT

George L. Herter, Waseca, Minn., assignor to Herter's, Inc., Waseca, Minn.

Filed Sept. 11, 1975, Ser. No. 612,536
Int. Cl.² A01K *87/00*
U.S. Cl. 43—18 GF **2 Claims**



1. An elongate tapered fishing rod formed of fiberglass reinforced plastic comprising:

an elongate handle;

an elongate end portion connected to said handle and projecting longitudinally therefrom, said end portion including an elongate intermediate section and an elongate end section detachably connected together, said intermediate section being detachably connected with said handle;

an elongate flex-resistant element secured to said end portion and extending throughout the length of said end section;

said flex-resistant element being formed of graphite threaded material and being of a lighter weight and greater stiffness than the fiberglass reinforced plastic to thereby impart substantial stiffness to that part of the end portion of the fishing rod with which it is associated without noticeably increasing the weight thereof, said flex-resistant element comprising an elongate flat strip having a cross-sectional size substantially less than the cross-sectional size of the hollow interior of said end section and being positioned interiorly thereof, said flex-resistant element extending diagonally of said end section from adjacent one end thereof to substantially the other end thereof.

4,015,361

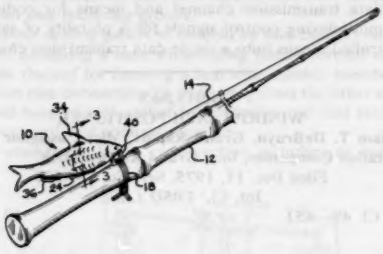
FISH HOOK RETAINER

James J. O'Reilly, and Agnes C. O'Reilly, both of 1232 Granville Road, Newark, Ohio 43055

Filed Oct. 10, 1975, Ser. No. 621,387
Int. Cl.² A01K *97/06*
U.S. Cl. 43—25.2 **8 Claims**

1. A one-piece plastic fish hook retainer comprising a first housing portion having the contour of a fish and forming a shallow cavity, a second housing portion having the contour of a fish of the same size and shape as the first portion and forming a second shallow cavity, said cavities forming a hook-retaining space when the two portions are in closed, cooperat-

ing relationship, a hinge structurally integral with both of said housing portions at common edges thereof corresponding to the belly of the fish, one of said housing portions having an upwardly-extending catch flange at the edge opposite said hinge, the other of said housing portions having a dorsal fin at



the edge opposite the hinge, said fin forming a groove to receive said flange, said fin being bendable to release said flange from said groove, the housing portion not having said dorsal fin having a release flange at the edge near said hinge to facilitate separation of said housing portions when the housing portions are to be separated.

4,015,362

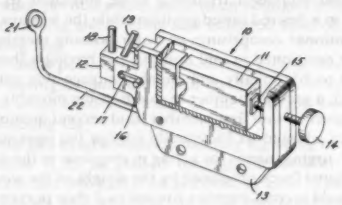
FISHING LINE RELEASE MECHANISM

C. Evan Johnson, Onekama, Mich., assignor to Hitachi Magnetics Corporation, Edmore, Mich.

Filed Mar. 15, 1976, Ser. No. 667,096

Int. Cl.² A01K *97/00*

U.S. Cl. 43—43.11 **7 Claims**



1. A fishing line release mechanism comprising: a housing defining an elongated passageway having an open end; a permanent magnet positioned within said passageway having a pole facing said open end; a tripping member composed of magnetic material positioned within the open end of said passageway, said tripping member being movable along said passageway from a position of strong attraction to said magnet to a position of weak attraction to said magnet; and at least one belaying pin mounted on said tripping member, said pin having its axis transverse to said passageway when said tripping member is in a position of strong attraction to said magnet and longitudinal with respect to said passageway when said member has been tripped to a position of weak attraction to said magnet as the result of a force exerted on said pin to pull said pin away from said magnet.

4,015,363

FISHING LURE

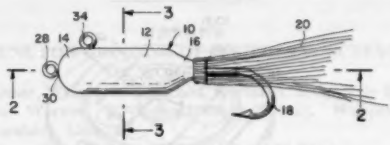
Joseph Sedlak, Clifton, N.J., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Jan. 19, 1976, Ser. No. 650,023

Int. Cl.² A01K *85/00*

U.S. Cl. 43—42.22 **5 Claims**

1. A fishing lure comprising fish hook means mounted in a buoyant metal cylinder means, eyelet means for securing fishing line to said cylinder, said eyelet means mounted in said cylinder forward of said hook, skirt means surrounding said hook, buoyancy adjusting means in said cylinder, said cylinder being streamlined and having a domed end and at the opposite end from said domed end, said cylinder slopes inwardly from the main cylinder wall towards the longitudinal axis of said



cylinder and then parallel to such axis, said fish hook extending outwardly from said sloping end, said eyelet means comprising first eyelet means mounted in the center of said dome and second eyelet means mounted between said dome and the center of said cylinder on the cylinder wall.

4,015,364

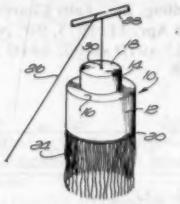
PINATA HAVING WEAKENED BOTTOM WALL AND MEANS FOR BREAKING SAME

Ramiro Oquita, 6014 Chandler Drive, San Diego, Calif. 92117

Filed Sept. 29, 1975, Ser. No. 617,602

Int. Cl.² A63H *33/00*

U.S. Cl. 46—11 **8 Claims**



1. A pinata, comprising:

a bottom wall having an extended surface;

side and top walls cooperating with said bottom wall to define a substantially enclosed chamber whereby a plurality of small items may be carried in said chamber on said bottom wall; and

means for suspending said pinata and for holding said bottom wall in assembled relation with, but free of direct attachment to, said side and top walls, comprising a suspension line through openings therefor in the top and bottom walls of said pinata and a retention member larger than said bottom wall opening secured to said suspension line exteriorly of said bottom wall, whereby to enable said pinata bottom wall to break-away upon successive pulling of said suspension line when a large number of said items are carried in said pinata on said bottom wall;

said means including at least one line of weakness through said bottom wall extended surface enabling at least a substantial portion of said bottom wall to break-away upon application thereto of a force which in the absence of said line of weakness would be insufficient to cause said break-away.

4,015,365

CHILD'S TOY

Albert Stubbmann, Franklin Lakes, N.J., assignor to Kohner, Inc., New York, N.Y.

Filed Aug. 29, 1975, Ser. No. 609,117

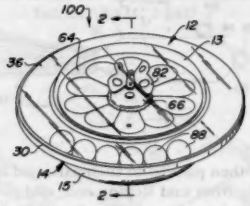
Int. Cl.² A63H *1/32*

U.S. Cl. 46—47 **18 Claims**

1. A child's toy comprising:

a transparent upper casing provided with a dome portion and an annular portion separated therefrom by a lateral annular segment;

a lower casing provided with a dome portion and an annular portion separated therefrom by a lateral annular segment, said lower casing being fixedly coupled to said upper casing, said coupled upper and lower casings being substantially watertight;



a disc disposed within said dome of said upper casing;

means suspended between said domes of said upper and lower casings for rotatably supporting said disc; and

means for producing rotary motion of said disc in response to movement of said upper and lower casings.

4,015,366

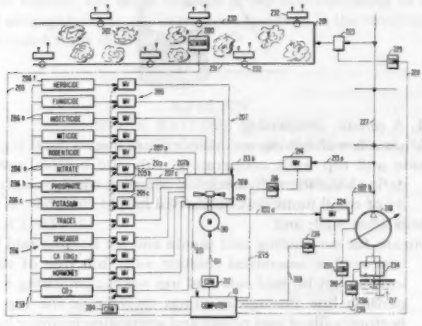
HIGHLY AUTOMATED AGRICULTURAL PRODUCTION SYSTEM

Arthur D. Hall, III, Port Deposit, Md., assignor to Advanced Decision Handling, Inc., Falls Church, Va.

Filed Apr. 11, 1975, Ser. No. 567,322

Int. Cl.² A01D *46/00*; **A01G** *27/00*, *13/00*

U.S. Cl. 47—1 R **88 Claims**



1. A computerized system for the production of agricultural products in an agricultural area which comprises a plurality of homogeneous agricultural areas, said system comprising:

a. sensing means for sensing a plurality of desired parameters in said plurality of homogeneous agricultural areas, which parameters are necessary to achieve desired agricultural product growth, and for generating sensor data output representative of said parameters;

b. a plurality of different controlled means operative in response to selectively applied control signals for producing desired changes in said parameters;

c. computing means for comparing said sensor data output to pre-established standards for said plurality of parameters in said agricultural areas, said computing means being programmed to generate said control signals as a result of the comparison of said sensor data output and said pre-established standards both directly and in relation to the sensed inter-relationship of such comparisons from others of said parameters and to optimize said control signals; and

d. data transmission means connecting said sensing means and said controlled means to said computing means for receiving said sensor data output from said sensing means and transmitting said sensor data output to said computing means, and for receiving said control signal from said computing means and transmitting said control signal to said controlled means, said data transmission means comprising means for coding and multiplexing sensor data output from a plurality of said sensing means onto a single data transmission channel and means for coding and multiplexing control signals for a plurality of said controlled means onto a single data transmission channel.

4,015,367

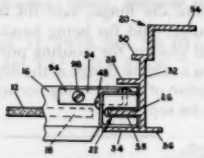
WINDOW SASH POSITIONER

William T. DeBruyn, Grand Rapids, Mich., assignor to The Citation Companies, Inc., Grand Rapids, Mich.

Filed Dec. 11, 1975, Ser. No. 639,625

Int. Cl.² E05D *13/08*

U.S. Cl. 49—451 **23 Claims**



1. A window positioner device for a vertically slidable window sash and an associated window jamb of the type having a rail with exposed sides extending vertically along at least a portion of the length of said jamb; said positioner providing relatively low frictional force upon said jamb as the window is raised and increased frictional force sufficient to hold the window in a desired raised position while the window is at rest, said positioner comprising: an outer housing member; a first member positioned in said housing and having a shoe portion adapted to frictionally and slidably engage one side of said jamb rail; a second member in said housing movably mounted with respect to said first member, said second member having a surface adapted to frictionally engage the opposite side of said rail; urging means for acting in response to the downward gravitational force produced by the weight of the window sash to urge said second member toward said shoe portion and into cooperative frictional engagement with said rail sufficient to hold the sash in place against its own weight; means mounting said second member for movement with respect to said first member and to said urging means in response to upward movement of the window sash, for thereupon decreasing the frictional engagement holding said second member with respect to said rail; and means for biasing said movably mounted second member into a first position, said urging means including cam means positioned between said housing and said second member, said cam means forcing said second member toward said shoe portion when said second member is in said first position.

4,015,368

DOOR OR PANEL SEAL

Charles T. Court, Texarkana, and Jessie H. Miller, Wake Village, both of Tex., assignors to Newcourt, Inc., Texarkana, Tex.

Filed Sept. 14, 1972, Ser. No. 288,956

Int. Cl.² E06B *7/23*

U.S. Cl. 49—488 **37 Claims**

1. A peripheral channel gasket for a door, panel, or the like comprising:

a rigid channel member having spaced side members extending from one side of a base forming a groove for receiving an edge of the door or panel,

said one side of said base between said side members being substantially flat,

each of said side members having a substantially flat surface which extends from said one side of said base to the opposite free end of said side member,

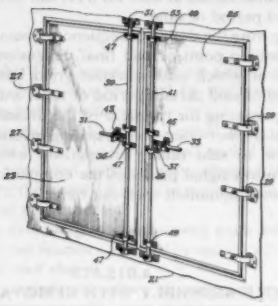
said substantially flat surface of each side member forming an angle of about 90° with said one side of said base,

structure formed on the other side of said base forming at least one receiving groove,

a flexible sealing gasket to be held by said channel member and including a base with sealing means formed on one side thereof for forming a seal with another member,

at least one connecting leg extending from the other side of said base of said gasket for insertion into said receiving groove of said channel member,

said connecting leg in cross section including an enlarged



head coupled to the base of the gasket by way of a smaller neck portion,

said receiving groove in cross section including a smaller entrance portion which leads to an enlarged holding zone for receiving and holding said enlarged head of said connecting leg,

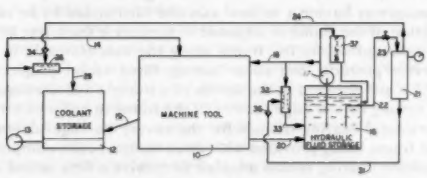
the entrance portion of said receiving groove in cross section having a minimum width less than the normal maximum cross sectional width of the enlarged head of the connecting leg,

said enlarged head of said connecting leg being constructed to allow it to be passed through the smaller entrance portion and into said enlarged holding zone of said receiving groove and which act to hold said enlarged head in said enlarged holding zone after insertion therein.

4,015,369
DEVICE FOR REMOVING WATER FROM HYDRAULIC FLUID

Gerald P. Dietrick, 523 Ridgeview Drive, Florence, Ky. 41042

Filed Dec. 16, 1975, Ser. No. 641,250
Int. Cl.² B24B 55/02; B01D 1/00
U.S. Cl. 51—2 R 7 Claims

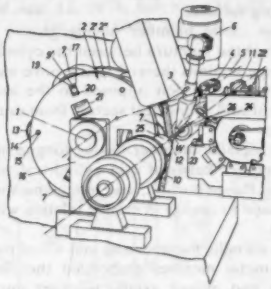


6. A tower for removing water from hydraulic fluid which comprises an enclosed chamber, an upright stationary rod in the chamber, a plurality of vertically spaced substantially horizontal plates mounted on the rod, means for directing the fluid to flow crosswise of each of the plates in a thin film and downwardly from plate to plate, means for impressing a vacuum on an upper end portion of the chamber to cause water entrained in the hydraulic fluid on the plates to vaporize and to remove the water from the chamber, and means for removing the hydraulic fluid from a lower end portion of the chamber.

4,015,370
MACHINE FOR GRINDING OF PERIPHERAL SURFACES ON WORK PIECES

Karl Lieser, Wuppertal-Elberfeld, Germany, assignor to Hermann Werner, a Kommanditgesellschaft, Wuppertal-Cronenberg, Germany

Filed Dec. 1, 1975, Ser. No. 636,526
Claims priority, application Germany, Dec. 30, 1974, 2461886
Int. Cl.² B24B 7/00
U.S. Cl. 51—90 9 Claims



1. A machine for grinding of peripheral surfaces on workpieces, particularly, screw driver blades, comprising

a rotatable tool carrier,

at least one grinding element arranged on said rotatable tool carrier,

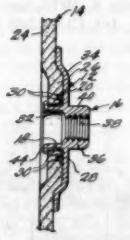
means for turning a workpiece to be ground,

means for driving said tool carrier in a predetermined transmission ratio synchronously to the turning of the workpiece such that said grinding element steps in an operative grinding position to the workpiece in periodic rotation synchronized with the turning of the workpiece.

4,015,371
GRINDING WHEEL ASSEMBLY

Judson M. Grayston, Joplin, Mo., assignor to Machinery Brokers, Inc., Springfield, Mo.

Filed Apr. 8, 1976, Ser. No. 674,926
Int. Cl.² B24B 41/04; B24D 5/16
U.S. Cl. 51—168 10 Claims



1. A grinding wheel assembly for attachment to a rotary shaft comprising in combination:

a sheet metal member shaped to define a cylindrical section extending radially outwardly from one end of said cylindrical section,

a wheel member having at least one operative abrasive surface and a disk-shaped central hub portion for connection with a rotating shaft,

said hub portion being molded of moldable material with said sheet metal member embedded therein in a position such that (1) the exterior surface of said cylindrical section and the surface of the annular flange section facing the opposite end of the cylindrical section are contacted by the moldable material of the hub portion and (2) the opposite surfaces of both sections of said sheet metal member are exposed, and

a cast metallic member including a cylindrical hub connecting portion having an exterior diameter slightly less than the interior diameter of the cylindrical section of said sheet metal member, an annular hub face engaging flange portion extending outwardly from one end of said cylindrical portion and a central shaft connecting portion extending axially from said annular flange portion having interior shaft end engaging surfaces and exterior wrench engaging surfaces,

said sheet metal member having groove means formed therein at the juncture between the cylindrical and annular flange sections thereof, said groove means being open in an axial direction opposed to the axial direction of extent of said cylindrical section from said annular flange section,

said cast metallic member having tongue means formed in the juncture between said cylindrical portion and said annular flange portion, said tongue means being of a size and shape to engage in mating relation within said groove means,

said cast metallic member and said wheel member with said sheet metal member embedded therein being aligned axially and moved axially together into an assembled position wherein (1) said cylindrical portion extends through the exposed interior surface of said cylindrical section outwardly of one face of said hub portion, (2) said flange portion is disposed in adjacent relation to the exposed surface of said annular flange section and the opposite face of said hub portion, and (3) said tongue means is engaged in mating relation within said groove means,

the extremity of said cylindrical portion of said cast metallic member extending outwardly of said one hub portion face being deformed annularly outwardly into axially inwardly engaged relation to said one hub portion face to fixedly retain said cast metallic member and said wheel member with said sheet metal member embedded therein in said assembled position.

4,015,372

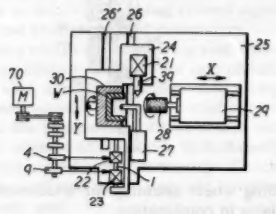
CAM-CONTROLLED GRINDING METHOD

Nobuo Fukuma, Toyota, and Hideyuki Matsubara, Toyoake, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Feb. 6, 1976, Ser. No. 656,076

Int. Cl.² B24B 1/00

U.S. Cl. 51—281 R **3 Claims**



1. In a grinding method which controls with a cam the relative positions of an abrasive wheel and a workpiece, each revolution of the cam comprising a single grinding cycle during which a single workpiece is ground as close as possible to a predetermined target dimension, the final portion of said cycle being a sparkout time, and which causes dressing of the abrasive wheel, with a dressing point in a fixed position with respect to the workpiece, during each grinding cycle to compensate for wear of the abrasive wheel, the improvement comprising the steps of:

a. measuring in process the processed dimension of a workpiece in each grinding cycle;

b. issuing a signal as soon as the dimension measured has reached the predetermined target dimension and simultaneously separating the abrasive wheel from the workpiece;

c. issuing a second signal when said sparkout grinding has been maintained at least for a certain minimum predetermined period of time;

d. comparing the timing or sequence of occurrence between the issuing point of said final dimension signal and the point at which said sparkout grind has completed the elapse of said certain period of time; and

e. compensating for the wear of the dresser by actuating a wheel-dresser-point-compensating-mechanism in response to said timing comparison whenever the final dimension signal precedes the completion of the predetermined minimum sparkout time.

4,015,373

MANHOLE ASSEMBLY WITH REMOVABLE COVER, ESPECIALLY FOR A CARRIAGEWAY

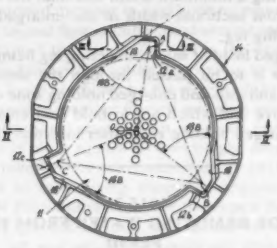
Pierre Boissier, Le Chesnay, France, assignor to Usines et Acieries de Sambre et Meuse, Feignies, France

Filed Feb. 6, 1976, Ser. No. 655,965

Claims priority, application France, Feb. 11, 1975, 75.04235

Int. Cl.² E02D 29/14

U.S. Cl. 52—20 **6 Claims**



1. In a manhole assembly fitted with a removable cover especially for a carriageway and comprising a flat frame which is anchored horizontally at the level of the carriageway in the service position, the said frame being such as to provide a passageway having a vertical axis and surrounded by an edge-section of the frame so adjusted as to receive the cover which is mounted within the frame along the axis aforesaid in the service position, the cover having three radial projections which are disposed at the apices of a triangle and are capable of resting on the edge-section of the frame in order to form a horizontal bearing triangle for the cover, the edge-section of the frame being provided with three recesses each comprising inclined bearing means adapted to receive a first lateral face of one of the three radial projections of the cover and to initiate a horizontal movement of rotation of the cover about its vertical axis under the action of the weight of the cover; the improvement comprising a retaining face defining one side of said recess and which is inclined downwardly outwardly away from said axis thereby to lock the projection in the recess against tilting movement of the cover about a side of said triangle.

4,015,374

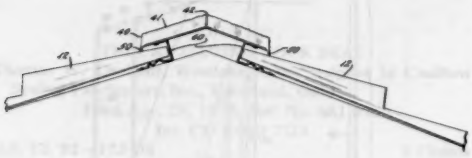
ANGLED CAP MEMBER FOR SIMULATED CEDAR SHAKE CONSTRUCTION

George Epstein, Akron, and Robert E. Mollman, Chagrin Falls, both of Ohio, assignors to Alside, Inc., Akron, Ohio

Division of Ser. No. 332,163, Feb. 13, 1973. This application Mar. 6, 1974, Ser. No. 448,623

Int. Cl.² E04D *1/30*

U.S. Cl. 52—57 5 Claims



1. A cap suitable for ridges and hips on a simulated shake roofing, said cap being characterized by the appearance of individual shakes and comprising:

an angled cap member having a central ridge extending longitudinally lengthwise thereof and angled side edges;

a plurality of simulated apparently overlapped shakes extending along the length of said cap member, on each side of the central ridge thereof;

a downwardly extending tongue forming each longitudinal edge of said cap member adapted to rest on a first course of simulated roof shakes;

means at the angled side edges of said cap member for interfitting successive like cap members angled side to angled side; and

nailing means at one of said angled side edges for securing said cap member to a roof.

4,015,375

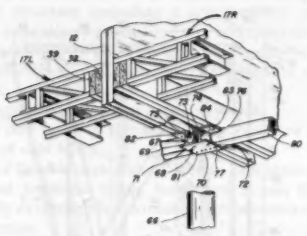
FLOOR FRAME ASSEMBLY FOR A MOBILE BUILDING

Fredrick H. Lindsay, Rte. 1, Box 71, Darwin, Minn. 55324

Filed Mar. 21, 1975, Ser. No. 560,792

Int. Cl.² B62D *25/00*

U.S. Cl. 52—143 9 Claims



1. A building comprising:

first and second unified floor frame assemblies having adjacent portions, said assemblies each including a plurality of parallel lower beams and a plurality of middle beams mounted to said lower beams, said assemblies further including a pair of adjacent interior sidewalls attached to said middle beams and extending therebeneath;

exterior sidewalls mounted to said assemblies;

wheeled carriages mounted to said assemblies facilitating transportation of said assemblies to a building site;

a skirt permanently mounted externally to said sidewalls and extending adjacent said floor assemblies;

supporting means connected to said assemblies at said adjacent portions operable to support said assemblies; and,

connecting means connected to said middle beams and to said supporting means, said connecting means slidably receiving said interior sidewalls;

said connecting means includes a bracket, said bracket has a plate attached directly to said supporting means, said bracket has a first and second upstanding wall fixedly mounted to said plate with said interior sidewalls of said assemblies positioned between said first and second upstanding wall, said frame assemblies including runners attached to said lower beams, one of said runners from each of said first and second assemblies rest atop and are attached directly to said plate, at least one of said middle beams of said first assembly rests atop and is attached to said first upstanding wall, at least one of said middle beams of said second assembly rests atop and is attached to said second upstanding wall.

4,015,376

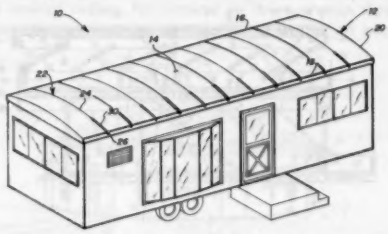
APPARATUS FOR STABILIZING A MOBILE HOME ROOF

Leslie L. Gerhardt, 1001 Ranch Road, Rte. 1, Cedar Hill, Tex. 75104

Filed Apr. 12, 1976, Ser. No. 675,957

Int. Cl.² E04B *7/00*

U.S. Cl. 52—23 9 Claims



5. The combination comprising:

a. a mobile home having a membrane-type roof suspended over a plurality of roofing trusses, and the roof membrane being formed from a series of large panels secured together at their adjacent edges so as to form seams in the roof, and the membrane being secured to the trusses and other structural members with conventional fasteners;

b. a plurality of brackets for attachment to the structural members along the edges of the roof, and said brackets having means for engaging the ends of a strap member, and said brackets being spaced approximately four feet apart along the edges of said roof;

c. a plurality of flexible but non-stretchable straps extending transversely across the roof of the mobile home, with there being one strap for each pair of brackets on opposite sides of the roof, and the length of said straps being less than the width of the mobile home; and

d. a plurality of helical springs including one spring for each strap, and the straps being sized such that a spring which connects one end of a strap to a bracket must be placed in tension in order to permit the opposite end of the strap to be connected with an opposite bracket, with said tensioned springs serving to keep the straps in contact with the membrane-type roof but not connected to same, whereby the roof is restrained by the straps against any upward movement as a result of wind gusts.

4,015,377

COLLAPSIBLE MULTILEVEL BUILDING

Andrzej Jastrzebski, 40, rue des Echevins B, Brussels, Belgium

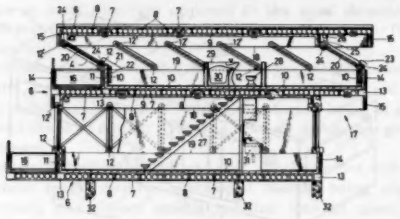
Continuation of Ser. No. 497,079, Aug. 13, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 645,312

Int. Cl.² E04B *1/344*

U.S. Cl. 52—66 3 Claims

1. A collapsible, multistory building structure comprising at least first, second and third platform members each extending in generally horizontal planes, said second platform member

being disposed between said first and third platforms, said building structure having wall means between said platform members extending from at least one of said platform members toward an adjacent platform member for providing an enclosed space between said first and second platform members and between said second and third platform members when said building structure is in its collapsed condition, said second platform member having surfaces facing said first and third platform members for forming the floor and ceiling respectively to the enclosed space formed above and beneath said second platform member each of said platform members having generally parallel sides said second platform member having a first set of supporting braces pivotally connected to its sides, said first set extending between said second platform member and said first platform member and being also pivotally attached to said wall means extending therebetween, said second platform member having a second set of supporting braces pivotally connected to its sides said second set extending between said second platform member and said third platform member and being also pivotally attached to said wall means extending therebetween each of said supporting braces being swingable in a vertical plane, a first number of



said supporting braces in said first set being connected to one end of said first platform member and extending to said second platform member and pivotally connected thereto at a distance from an end of said second platform member equal to the length of said brace, a first number of said supporting braces in said second set extending from one end of the opposite face of said second platform member to said third platform member and pivotally connected thereto at a distance from an end of said third platform member equal to the length of a said brace, each of said braces in said first and second sets being equally spaced from each adjacent brace whereby said braces allow movement in an angular pivoting fashion between said first, second and third platform members relative to one another and whereby said first, second and third platform members when collapsed, form a parallelepiped shaped unit and when raised establish a stepped relationship between adjacent platforms so that one end of said second and third platform members is cantilevered over at least the next adjacent lower platform member thereby forming an overhanging roof, the opposite end of said second and third platform member being stepped away from and exposing the next lower platform member thereby forming a gallery area in the lower platform member.

4,015,378

DEVICE FOR CLAMPING FLAT PANELS AGAINST METAL SECTION UPRIGHTS, PARTICULARLY FOR LINING DRYING CHAMBERS

Enrico Fava, Cento (Ferrara), Italy, assignor to Essiccatoi Fava S.p.A., Cento (Ferrara), Italy

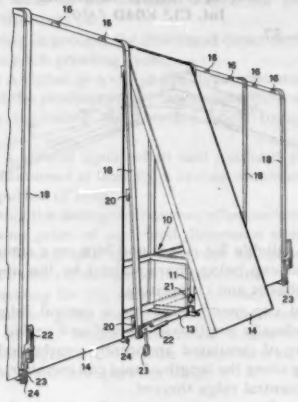
Filed June 1, 1976, Ser. No. 691,873

Claims priority, application Italy, June 12, 1975, 24316/75

Int. Cl.² E04B *2/82*

U.S. Cl. 52—127 **3 Claims**

1. Device for clamping flat panels against a supporting structure comprising spaced metal section uprights and upper and lower horizontal cross members, particularly for lining drying chambers, comprising means for hooking or hinging the individual panels to the upper horizontal cross members of the supporting structure, and butt straps fastened upperly to the structure and designed to vertically cover the joints between two adjacent panels at the structure uprights, each of said butt straps being provided on that face facing the respective upright with a series of projecting wedge-shaped elements



spaced apart and arranged to co-operate with a like number of inclined plane intake pieces projecting from the upright, means being also provided at the lower end of each butt strap to exert a traction downwards thereon so as to lock the wedge-shaped elements in the respective inclined plane intake pieces and to exert a pressure on the panel edges in a direction perpendicular to the support surfaces of the uprights.

4,015,379

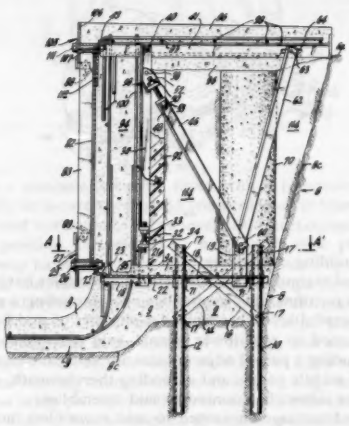
IN-GROUND SWIMMING POOL AND APPARATUS AND METHOD FOR CONSTRUCTING SAME

Andrew Elliott Colson, Jr., 22 Way Drive, Summit, N.J. 07901

Filed June 10, 1976, Ser. No. 694,828

Int. Cl.² E04H *3/16*

U.S. Cl. 52—169.1 **22 Claims**



1. In combination in apparatus for fabricating a pool, plural pair of anchor posts spaced about a pool periphery, at least one of each pair of said anchor posts being partially axially disposed in a pool substrata, plural horizontally disposed locator arm means each affixed to a different pair of said anchor posts, plural frame lattice means each affixed to a different, associated one of said locator arm means, outer pool

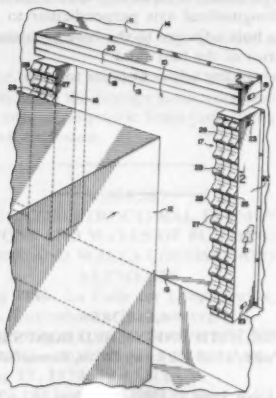
wall defining form means affixed to said frame means and oriented in a direction between adjacent ones of said frame means, plural bottom form retaining runner means each secured to a different, adjacent pair of said locator arm means, plural upper form retaining means each affixed to a different adjacent pair of said frame means, and plural contiguous inner pool wall defining form sheet means secured between said upper and bottom form retaining runner means and oriented in a direction between adjacent ones of said frame means.

4,015,380

TRUCK LOADING DOCK SEAL

Thomas W. Chalfant, Westlake, Ohio, assignor to Chalfant Sewing Fabricators, Inc., Cleveland, Ohio

Filed Apr. 28, 1976, Ser. No. 681,075
Int. Cl.² E06B 7/23
U.S. Cl. 52—173 DS **3 Claims**



1. In a loading dock seal structure supported along the outside top and sides of a wall adjacent a loading dock doorway, said structure including a top member and two side members to sealingly engage the top and sides of the end of a truck or trailer cargo body backed into loading and unloading position relative to said doorway, each of said side member comprises:

an elongated upright compressible block,

at least one layer of flexible material secured to the outer face of said block,

a strip of flexible material secured to said layer at uniformly spaced locations along horizontal seams to form outwardly extending horizontal bulges between said horizontal seams,

whereby upon engagement by said cargo body said bulges collapse accordion fashion to a flattened condition against said layer and the interior surfaces of said bulges slide against one another in a vertical direction to accommodate vertical movement of said truck cargo body during loading and unloading in its docked position against said seal.

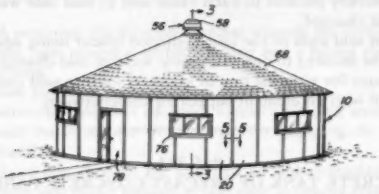
4,015,381

ROUND BUILDING WITH COMBINED CENTER SUPPORT TUBE AND FLUE STRUCTURE

Norbert T. Schmidt, 716-10th Ave. East, Alexandria, Minn. 56308

Filed Sept. 24, 1975, Ser. No. 616,301
Int. Cl.² E04H 1/00
U.S. Cl. 52—199 **9 Claims**

1. In combination, a generally circular building having a foundation, an upstanding perimeter wall supported from and enclosing a generally circular interior area above said foundation, a roof structure bridging the upper marginal portions of said perimeter wall and defining a vaulted ceiling closure for said interior area, a plurality of angularly spaced upstanding partial cylindrical interior partition walls supported from said foundation spaced inwardly of said perimeter wall, said partition walls being generally concentric relative to said perimeter wall and defining a substantially open central portion of said interior area inwardly of said partition walls, one end of each of said partition walls including an upstanding full radial partition extending between the partition wall and a corresponding portion of said perimeter wall and the other end of each of said partition walls including an upstanding partial portion extending outwardly toward but terminating a spaced distance inwardly of a corresponding portion of said perimeter wall, partial inwardly projecting partitions extending inwardly from peripherally spaced portions of said perimeter wall toward and terminating outwardly of portions of said partition walls spaced intermediate the corresponding full and partial partitions thereof, a space heater structure mounted centrally within said interior area, said interior area being substantially completely open, in vertical directions, from said foundation to said vaulted ceiling, for vertical air flow currents therein, whereby rising convection air currents of heated air may be



generated in the central portion of said interior area by said space heater structure and the convection air currents may thereafter move downwardly along the inner surfaces of said vaulted ceiling and perimeter wall and thereafter inwardly over said foundation toward said central portion of said interior area, said building including a central upstanding roof support column supported at its lower end from said foundation centrally of said area, at least an upper portion of said column being hollow, a support frame encircling and supported from said column at a level spaced above the upper portions of said perimeter wall structure and spaced outwardly of said column, said roof structure including downwardly and outwardly inclined roof rafter members spaced about said column in generally radial planes with their upper innermost end portions anchored relative to corresponding portions of said frame and their lower outermost end portions anchored relative to the upper portions of corresponding portions of said perimeter wall structure, said roof structure including a central void area defined by upper marginal portions of said roof structure spaced outwardly from and extending about the upper end portion of said column, and a cap structure supported from said upper marginal portions of said roof structure toward and terminating outwardly of portions of said partition walls spaced intermediate the corresponding full and partial partitions thereof.

4,015,382

REINFORCED DOOR FRAME

Harry M. Noyes, McKean, Pa., assignor to Fenestra, Erie, Pa.

Filed Aug. 10, 1976, Ser. No. 713,188
Int. Cl.² E06B 1/04
U.S. Cl. 52—204 **5 Claims**

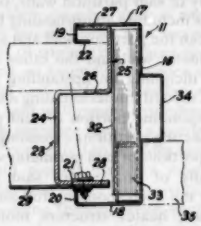
1. A door frame comprising a head section and two jamb sections,

said sections each comprising an elongated generally channel shaped member and a generally Z-shaped stiffener

member defining generally flat front wall and substantially flat side walls extending generally perpendicular to one side of said front wall,

the outer end portion of said side walls being bent inwardly at approximately 90° forming a channel,

the inner ends of said channel being bent toward said front wall forming a first inner end and a second inner end generally parallel to each other,



a generally Z-shaped spacer approximately equal length to said front wall,

said spacer having a first leg and a second leg disposed generally parallel to each other and to said side walls of said channel,

one of said ends of the said Z-shaped spacer being adapted to be secured to one of the side walls of said channel and means for securing one of said end walls to said one side wall with an element supported therebetween.

4,015,383

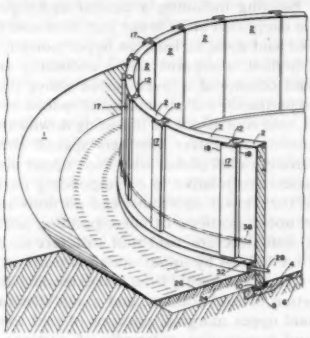
CONCRETE TANK OF PRECAST CONCRETE PANELS WITH PRETENSIONING BEAM MEANS

Francis X. Crowley, 24 Lanark Road, Wellesley, Mass. 02181

Continuation of Ser. No. 418,443, Nov. 23, 1973, abandoned. This application May 9, 1975, Ser. No. 576,121

Int. Cl.² E04H *12/16*

U.S. Cl. 52—224 **3 Claims**



1. A tank wall comprising:

a multiplicity of precast panels of concrete, laterally spaced-apart over their entire thickness, and vertically one-piece integral over the entire height of said wall,

cast concrete filler units filling the entire spaces between said panels,

a plurality of vertically spaced-apart cast continuous circular concrete beams contiguous with said panels,

said beams forming horizontal collars surrounding said wall to reinforce said wall, and

metal reinforcing means surrounding said wall and covered by the concrete of said beams,

said reinforcing means being in tension while the tank formed by said wall is empty, thereby to stress said wall.

4,015,384

CONSTRUCTION OF TANK

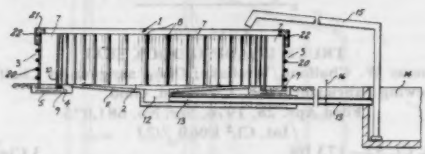
Anthony Dermot Barry, Cork, Ireland, assignor to John A. Wood Limited, Victoria Cross, Ireland

Filed June 10, 1975, Ser. No. 585,457

Claims priority, application Ireland, June 13, 1974, 1237/74

Int. Cl.² B65G *5/00*

U.S. Cl. 52—224 **14 Claims**



1. A cylindrical tank comprising:

a base;

a plurality of concrete pipes erected on the base each having its longitudinal axis perpendicular to the base and having a hole adjacent to the base to communicate with the interior of the tank; and

means for grouting adjacent pipes together.

4,015,385

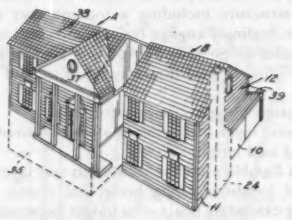
HOUSE WITH UNFINISHED BONUS SPACE

William J. Pulte, 1505 Kirkway Drive, Bloomfield Hills, Mich. 48013

Filed June 2, 1975, Ser. No. 582,679

Int. Cl.² E04H *1/04*

U.S. Cl. 52—236 **9 Claims**



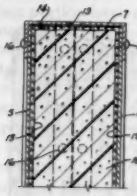
1. A house comprising;

a two story generally rectangular finished exterior shell, a central entrance in one of the longer side exposures of said rectangular shell, a vertical wall structure extending between said longer side exposures at one side of said entrance dividing the house into two major internal two-story portions of comparable size, the portion having said entrance being finished with complete initial living quarters including living, kitchen, eating, multiple bedroom, closet, bath, hall and stairway accommodations, the other portion including a built-in garage (bounded by at least two interior walls), and adjacent unfinished first floor room space, floor structure overlying both said garage and adjacent first floor room space for unfinished second floor rooms adjacent said vertical wall structure, and provisions including means for convenient utility connections facilitating optional future completion of said other portion to include desired supplemental finished rooms on both stories.

4,015,386
FIRE-RETARDANT LOW TEMPERATURE INSULATING BUILDING PANEL

Sanford L. Cook, Edison, N.J., assignor to Clark Door Company, Inc., Cranford, N.J.

Filed Feb. 7, 1975, Ser. No. 547,919
Int. Cl.² E04C 2/26; E04B 1/94
U.S. Cl. 52—232 4 Claims

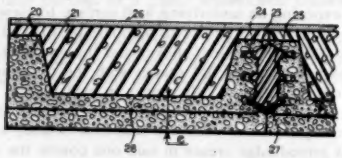


1. A fire-retardant low temperature insulating panel comprising:
a. a sheet metal casing having top, bottom, side and end walls,
b. a layer of hydrous alkaline metal silicate substantially completely lining the interior surfaces of said casing, and
c. a poured core of polymeric foam resin filling the interior of the lined enclosure.

4,015,387
PREFABRICATED STRUCTURAL ELEMENTS FOR PARTITIONS AND WALLS OF BUILDINGS AND PARTITIONS AND WALLS CONSISTING OF SUCH ELEMENTS

Etienne Lucien Tillie, La Colle sur Loup, France, assignor to Tramex S.A., Luxembourg, Luxembourg

Filed Aug. 14, 1974, Ser. No. 497,325
Claims priority, application France, Aug. 30, 1973, 73.31439; May 17, 1974, 74.17311
Int. Cl.² E04C 1/00
U.S. Cl. 52—309.17 9 Claims

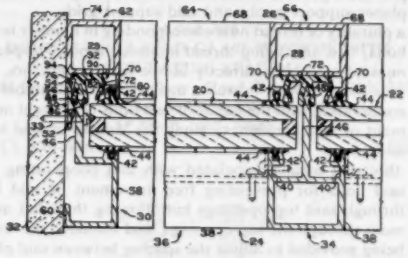


1. A prefabricated core element for the construction of partitions and bearing walls of buildings, said core element having the shape of a substantially parallelepipedic plate having peripheral edges and comprising a composite of a first section formed of a thermal insulation material having the face thereof constituting one face of the core element and a second section having the face thereof constituting the opposed face of the core element and being coextensive throughout the area of said core element with said first section, said second core section being made from a lightweight, rigid and strong loadbearing material having a U-shaped cross section with enlarged parallel peripheral edges having load bearing capacity and occupying the major portion of the thickness of the core element at least along said peripheral edges, said first member filling the interior of said U-shaped second member and extending over the peripheral edges thereof to form an entire face, said second core section having on at least one of the edges thereof a plurality of longitudinal grooves and a plurality of blind bores formed in said grooves extending into said core at an angle with respect to the edge surface, said grooves and blind bores being adapted to be filled after juxtaposition with a like prefabricated element with a settable binder injected therebetween.

4,015,388
RETAINING CLIP FOR A DIVISION BAR

James W. Hemminger, Buchanan, Mich., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 14, 1976, Ser. No. 649,119
Int. Cl.² E04B 1/62
U.S. Cl. 52—395 26 Claims

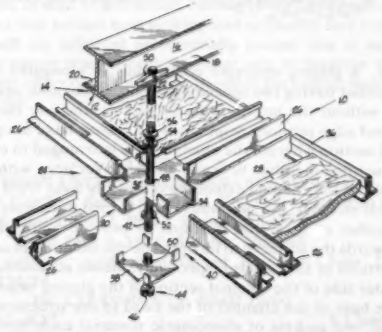


1. A retaining clip for a division bar wherein the division bar is of the type having a gutter member and a facing member, comprising:
a base having a major surface;
a bifurcated member attached to and extending away from said major surface of said base for engaging the gutter member;
at least one flexible leg attached to and extending away from said major surface of said base in spaced relation to said bifurcated member; and
means formed on at least said at least one flexible leg for maintaining the clip in the facing member.

4,015,389
CEILING SYSTEM AND PREFABRICATED OVERHEAD BUILDING ASSEMBLY USING THIS SYSTEM

Neil Jay Thompson, Palatine, Ill., assignor to Johns-Manville Corporation, Denver, Colo.

Filed Apr. 17, 1975, Ser. No. 569,111
Int. Cl.² E04B 5/52; E04C 3/30
U.S. Cl. 52—475 14 Claims



1. A prefabricated overhead building assembly, comprising:
a. a prefabricated overhead building structure including planar support means having a plurality of spaced top openings extending therethrough;
b. a ceiling support grid positioned below and adjacent to said planer support means and including
i. a plurality of elongated support runners, and

ii. a plurality of connectors connecting said runners together to form said grid, said connectors including respective bottom openings extending therethrough and corresponding in number to said top openings, said bottom openings being in vertical alignment with said top openings;

c. a plurality of threaded bolts having enlarged heads and corresponding in number to said top and bottom openings, said bolts extending through respective ones of said bottom openings and into vertically aligned top openings such that the heads of said bolts lie below and adjacent said connectors, said bolts being of sufficient length to provide a predetermined maximum spacing between said planer support means and said support grid;

d. a plurality of thread nuts corresponding in number to said bolts, said nuts being thread mounted around respective ones of said bolts directly above said connectors, said nuts being thread movable against said connectors and cooperating with the heads of said bolts to prevent movement of said connectors along the lengths of said bolts; and

e. threaded means associated with and cooperating with said bolts for preventing free movement of said bolts through said top openings but allowing threaded movement through the top openings, said threaded movement being provided to adjust the spacing between said planer support means and said grid.

4,015,390

GLAZING STRUCTURES

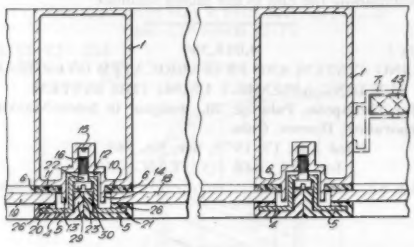
Ronald Howorth, Littleborough, England, assignor to BTR Industries Limited, England

Filed May 25, 1976, Ser. No. 689,848

Claims priority, application United Kingdom, Oct. 29, 1975, 44674/75

Int. Cl.² E04B *1/00*

U.S. Cl. 52—495 **3 Claims**



1. A glazing structure comprising an elongated structural member having two spaced apart surfaces to abut against, with or without the interposition of gaskets, the one faces of two panel edge portions respectively, a glazing bead of open channel section whereof the channel base is arranged to engage the structural member between the said surfaces with the side walls of the channel extending outwardly away from the structural member, the side walls being turned outwardly from one another at their end portions to provide abutments facing towards the surfaces to lie opposite the other faces of the edge portions of the panels respectively, means accessible from the outer side of the channel section of the glazing bead to secure the base of the channel of the bead to the structural member and two gaskets of elastomeric material each having a first portion to lie between the abutment and the other faces and second portions to enter within the channel of the glazing bead, the arrangement being such that the glazing bead can first be secured to the structural member with the first portions of the gaskets secured between the bead and the panels to hold the panels in position and the second portions can then be pressed side by side into the channel to form a weatherproof seal for the channel.

4,015,391

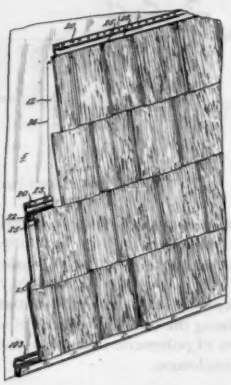
SIMULATED CEDAR SHAKE CONSTRUCTION

George Epstein, Akron, and Robert E. Mollman, Chagrin Falls, both of Ohio, assignors to Alside, Inc., Akron, Ohio

Filed Feb. 13, 1973, Ser. No. 332,163

Int. Cl.² E04D *1/26*

U.S. Cl. 52—520 **6 Claims**



1. A simulated shake panel characterized by the random appearance of individual shakes comprising a board-shaped panel member having:

means at the top, bottom and side marginal edges of said panel member for interfitting successive like panels top to bottom and side to side;

nailing means for securing said panel to a building, said nailing means being concealed when successive like panels are interfitted;

the front face of said panel comprising a plurality of simulated side by side underlapped randomly sized shakes in at least two courses thereof, each shake course having a random butt line, said shakes being disposed in top and bottom overlapping and underlapping relation, apparently exposing an underlying wall surface to view at the side by side and top and bottom underlaps, the end shakes in one course being half-shakes and the end shakes in a second course being full shakes with the terminus of at least one of the end full shakes in said second course being spaced inward on the panel face from the terminus of the adjacent half-shake of said first course, whereby panels joined edge create in said one course the simulation of a cracked full shake spanning the side edge joint masking same in the said one course, and leaving a full side-by-side shake underlap appearance at the side edge joint of said second course, said underlap being visually the same as the underlapped intra-panel side-by-side shakes.

4,015,392

BUILDING WALL PANEL SYSTEM

James W. Eaton, Sleepy Hollow, Ill., assignor to Masonite Corporation, Chicago, Ill.

Filed Jan. 26, 1976, Ser. No. 652,413

Int. Cl.² E04D *1/00*

U.S. Cl. 52—533 **8 Claims**

1. An integral siding/roofing building wall panel, comprising:

an elongated rectangular base portion formed of structural sheet material having opposite spaced apart inner and outer faces,

said base portion having longitudinal upper and lower edges dimensioned to span across for attachment with at least

one pair of spaced apart upwardly extending parallel structural supports of a building structure, said lower edge of said base portion sloping upwardly at an acute angle from said inner face toward said outer face,

said base portion including opposite ends adapted to lie along said structural supports and of sufficient thickness between said faces for providing a rigid wall,

an outer surface portion formed of sheet material on the outer face of said base portion,

said outer surface portion having an outer, weather resistant surface formed by an embossing process to resemble a plurality of shingle elements laid side by side and having an upper edge spaced downwardly and parallel of said upper edge of said base portion forming an exposed fastening strip surface on said outer face of said base portion along said upper edge, said outer surface portion terminating along said upper edge with an interlocking surface sloping upwardly and outwardly of said fastening strip surface of said base portion at an acute angle adapted for positive interlocking engagement with said sloped lower

edge of said base portion of another of said building wall panels placed in an adjacent upward level against said structural supports,

said outer surface portion having a lower edge portion projecting downwardly of said lower edge of said base portion and having an inner face portion adapted to abut and overlie said fastening strip surface on the base portion of another of said building wall panels interlocked therewith when placed in an adjacent lower level against said structural supports,

said lower edge portion having an irregular lower edge formed to resemble lower edges of shingle elements placed side by side, and said outer surface portion formed with grooves between adjacent shingle elements open along said lower edge to discharge water onto the outer surface portion of a panel interlocked therewith in an adjacent lower row and

a key spline along said upper edge of said outer surface portion, said key spline having a lower portion embedded in said base portion and sloping parallel of said interlocking upper edge of said outer surface portion.

4,015,393

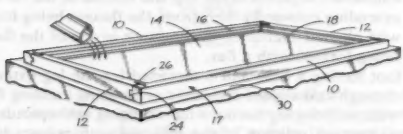
PANEL WITH CORE AND METHOD OF CONSTRUCTING

Charles Herbert Warwick, 1800 SW. North Shore Road, Lake Oswego, Oreg. 97034

Filed June 4, 1973, Ser. No. 366,340

Int. Cl.² E04B *2/28*

U.S. Cl. 52—615 **3 Claims**



1. A panel comprising

an outer frame of side and end rail members joined together at corners with mortise and tenon joints, and a core of fire-resistant material within and bounded by said frame,

a joint in said frame including a tenon portion presented by and an integral part of one of said rail members fitting within a mortise portion presented by an an integral part of another of said rail members, and at least one of said portions being part of a continuous expanse of like cross-sectional profile extending along the rail member which presents the portion, along that side of the rail member which faces said core,

said core having an edge margin extending alongside said continuous expanse which lies against and is shaped to have a locking fit with said continuous expanse said mortise and tenon portions having a shape forming a dovetail joint, and the locking fit of said edge margin of said core with said continuous expanse being a dovetail fit.

4,015,394

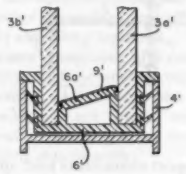
DOUBLE-INSULATED GLASS WINDOW WITH INSULATING SPACER

Gerald Kessler, 388 Cranberry Road, Broadman, Ohio 44512

Filed Oct. 14, 1975, Ser. No. 622,088

Int. Cl.² E04B *1/62;* **E04F** *15/14*

U.S. Cl. 52—616 **1 Claim**



1.

a. An insulating window comprising two parallel spaced-apart glass panes separated by an enclosed interior space,

b. a plastic space member sealing and separating said glass panes, said space member extending longitudinally along the outer edges of the panes between their inner faces, and having an interior surface which faces the interior space between the two panes and extends laterally between said inner faces of the panes,

c. an impermeable, very thin metallic coating on said interior surface of the plastic member extending continuously from one of said panes to the other and thus shielding the interior space between the two panes from direct contact with said interior surface of the plastic member,

d. said interior surface of the plastic member extending at an angle to the inner faces of said panes, and the exposed surface of said impermeable coating being highly reflective so that radiant heat striking said surface of said coating will be reflected preferentially toward one of said panes rather than toward the other one, to increase the heating effect on the side toward which the radiant heat is directed.

4,015,395

PUNCHEON UNIT FOR BUILDERS SCAFFOLDING

Peter Eric Gostling, Sutton Coldfield, England, assignor to C. Evans & Sons Limited, Ilford, United Kingdom

Filed June 9, 1975, Ser. No. 585,065

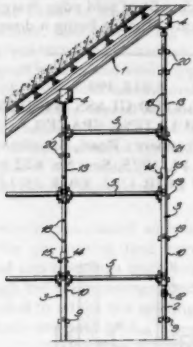
Claims priority, application United Kingdom, June 13, 1974, 26276/74

Int. Cl.² E04G *1/14;* **E04H** *12/00*

U.S. Cl. 52—637 **8 Claims**

1. A puncheon unit for use with a scaffold structure of the kind comprising upright support members having support elements arranged at a standard spacing, and cross members attached at their ends to said support elements, said puncheon unit comprising an outer tubular member formed at one end to be attached to an upright support member of said scaffold structure and, at or near its other end, with a transverse hole to receive a locking pin, an inner tubular member telescopi-

cally received in said outer member and formed with a series of spaced transverse holes to coact with said hole of said outer member, wherein both said outer member and said inner member are additionally provided with spaced cross member channel-shaped support elements, the spacing of said support elements of said outer member corresponding to said standard

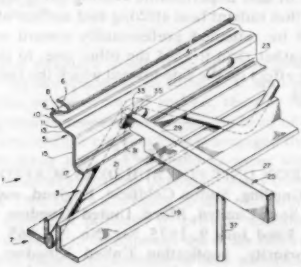


spacing of said support elements of said upright support members, and the spacing of said transverse holes and said support elements of said inner member being from a fraction up to 1 times said spacing, said spaced cross member channel-shaped support elements each projecting the same distance from the longitudinal axis of said inner and outer tubular members.

4,015,396
JOIST

Ernest Otto Butts, and Felix F. Laurus, both of Ottawa, Canada, assignors to Hambro Structural Systems Ltd., Ottawa, Canada

Filed June 3, 1975, Ser. No. 583,289
Claims priority, application Canada, June 11, 1974, 202200
Int. Cl.² E04C *3/16, 3/293, 3/07*
U.S. Cl. 52—690 **10 Claims**



1. A steel joist for use in a composite concrete and steel floor constructed by using concrete pouring form panels, said joist having upper and lower chords vertically spaced by a joining web, characterized by said upper chord comprising:

a single elongated member having an upper section with substantially a zig-zag cross section including integral top, oblique and lower portions the latter of which has an underside that extends transversely substantially flat from the lower end of said oblique portion for a substantial horizontal distance to an outer end,

said elongated member further having, integral with said upper section, a lower section including a concrete pouring form panel support shelf extending horizontally in both the longitudinal and transverse directions of said elongated member, and

said lower section of said elongated member further including vertically offsetting step down means integrally connecting said lower portion at its said outer end to said shelf for limiting the horizontal extent a first pouring panel can be pushed under said lower portion on one side of said step down means and providing the said shelf on the other side thereof at a given vertical level for supporting a pouring panel like said first panel at substantially the same level as said first panel.

4,015,397
SERVICE POLES AND ACCESSORIES

Charles T. Flachbarth, and John L. Myers, both of Parkersburg, W. Va., assignors to Textron, Inc., Providence, R.I.

Division of Ser. No. 464,803, Apr. 29, 1974, U.S. Pat. No. 3,889,044. This application Apr. 28, 1975, Ser. No. 572,466
Int. Cl.² E04B *1/38*
U.S. Cl. 52—713 **6 Claims**

1. For a service pole for supplying power and/or telephone outlets in a room and pole being adapted to extend between the floor and ceiling of the room and the ceiling being the suspended type having means for supporting panels, a pedestal comprising;

a bracket having a base and a pair of flanges respectively connected adjacent to the top and bottom of the base and extending outwardly therefrom, the flanges being formed with aligned apertures, the aperture in one of the flanges being formed with a flat;

a foot having a base and a threaded leg the leg extending through said aligned apertures and making a sliding therewith, and the leg having a flat engaging said aperture flat to prevent rotation of the pedestal with respect to the bracket;

a pair of nuts threaded on said leg respectively on the top side and bottom side of one of said flanges for securing the leg to the flange;

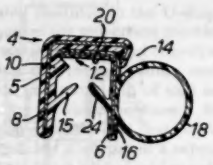
a cavity formed in the bottom of said base; and

plate means mounted in said cavity for engaging the floor on which the pole is mounted.

4,015,398
CHANNEL-SHAPED SEALING, FINISHING AND GUIDING STRIPS

Robert G. Bright, Gerhart-Hauptmann-Strasse 5, 406 Viersen 1, Germany

Filed Sept. 10, 1975, Ser. No. 612,201
Int. Cl.² E04C *2/38*; E08B *3/00*
U.S. Cl. 52—716 **14 Claims**



1. A sealing strip, comprising

reinforcing metal carrier means defining a generally channel shape having a base and side walls,

flexible covering material enclosing the base and the side walls of the channel, and

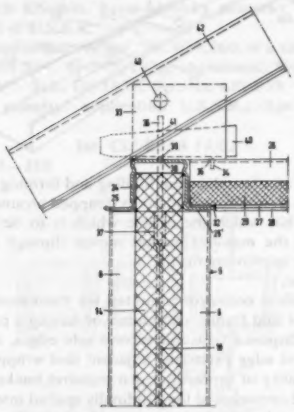
respective gripping ribs defined by and integral with the said flexible covering material and positioned on the inner, facing, surfaces of the said side walls of the channel, the ribs extending along the said surfaces longitudinally of the channel and being directed towards each other,

the ribs on the respective surfaces being of different hardnesses.

4,015,399
BUILDING, METHOD AND APPARATUS FOR THE CONSTRUCTION THEREOF

Pier Prins, Damwoude, Netherlands, assignor to Prins N.V., Dokkum, Netherlands

Filed Dec. 31, 1974, Ser. No. 537,828
Int. Cl.² E04B *1/14*
U.S. Cl. 52—747 **6 Claims**



1. A method of erecting a building essentially from pre-fabricated elements comprising steel carrying and supporting sections and wall, ceiling, floor, roof and the like panel members, wherein the carrying and supporting sections are generally U-shaped in cross section and formed with at least one end flange extending generally outwardly from the end of at least one of the legs of said U-shaped sections, comprising:

securing first ones of said sections having a single end flange, peripherally embracing the floor so that said single end flange of each extends upwardly from the floor;

securing stiles to said single end flange of said first ones of said sections so as to extend upwardly from the floor, said stiles being formed by second ones of said sections having two legs each formed with an end flange extending generally outwardly from the end thereof;

peripherally clampingly engaging wall panels between laterally spaced adjacent stiles for the former to be retained therebetween;

securing anchor means to the upper portion of the stiles, said anchor means having a vertically extending upper portion;

securing tie beams between upper portions of opposing stiles in engagement with the upper portion of the anchor means so as to hold the stiles mutually together, said tie beams comprising third ones of said sections having two legs each formed with an end flange extending generally outwardly from the end thereof, said legs extending downwardly;

clampingly engaging wall plates to the upper margins of the wall panels so as to overlie the upper ends of the stiles with the upper portion of the anchor means extending through the wall plates, said wall plates being formed by fourth ones of said sections having two legs each formed with an end flange extending generally outwardly from the downwardly extending legs; and

anchoring roof beams comprising fifth ones of said sections to the upper portion of the anchor means for supporting roof panels thereon, each of said fifth ones of said sections having two legs each formed with an end flange extendng generally outwardly from the end thereof and said legs extending downwardly.

4,015,400
METHOD OF OPENING MEDICAL LIQUID CONTAINER WITH SEPARABLE OUTER AND INNER CLOSURES

Pradip V. Choksi, North Hollywood, and Roy B. Steidley, Seal Beach, both of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Division of Ser. No. 338,662, Mar. 7, 1973, U.S. Pat. No. 3,923,183. This application Sept. 15, 1975, Ser. No. 613,635
The portion of the term of this patent subsequent to Apr. 20, 1993, has been disclaimed.
Int. Cl.² B65B *43/40*
U.S. Cl. 53—3 **5 Claims**

1. A method of opening a sterile medical liquid container with a dispensing outlet closed by an inner closure and an outer externally threaded cap bonded to the container comprising the steps of:

rotating an internally threaded annular ring in a given direction to screw this ring onto the outer cap with said ring being totally free of any contact with said inner closure;

further rotating the annular ring in the same direction for fracturing the outer cap;

lifting the combined threaded ring and outer cap from the inner closure;

and thereafter opening the inner closure after the threaded ring and outer closure have been completely separated therefrom.

4,015,401

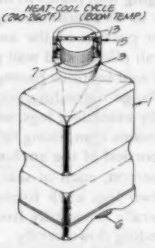
METHOD OF FORMING CLOSURE SYSTEM FOR MEDICAL LIQUID CONTAINER

Elmer F. St. Amand, North Hollywood, and Thomas R. Thornbury, La Crescenta, both of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Division of Ser. No. 338,684, Mar. 7, 1973, Pat. No. 3,923,062. This application Apr. 17, 1975, Ser. No. 568,989

Int. Cl.[2] B65B *53/06, 43/00, 7/28;* **B67B** *3/20*

U.S. Cl. 53—29 **4 Claims**



1. A method of forming a bacteria-tight hermetic seal at an outlet of a container for sterile liquids, comprising the steps of:

a. blow molding at a pressure of 50 to 150 psi a first thermoplastic material to form a container with a threaded neck having internal stresses;

b. injection molding at a pressure of 5,000 to 20,000 psi a second thermoplastic material to form a rigid closure with a top wall and a depending skirt having internal threads, with said skirt being thicker than the depth of threads in the skirt, said closure having substantially greater internal stresses than the container neck;

c. placing liquid within the container;

d. assembling the threaded closure onto the threaded neck;

e. subjecting both the top wall and thick threaded skirt of the rigid closure as well as the threaded container neck to a common stress relieving environment to form therebetween a bacteria-tight joint that is openable with a predetermined force of 10 to 30 inch pounds of torque.

4,015,402

APPARATUS AND METHOD FOR LOADING BLOCK-LIKE ARTICLES INTO A RECEPTACLE

David K. Domnitz, Taylors, and Billy R. Osborne, Woodruff, both of S.C., assignors to W. R. Grace & Co., Duncan, S.C.

Filed Feb. 19, 1976, Ser. No. 659,382

Int. Cl.[2] B65B *43/36*

U.S. Cl. 53—29 **11 Claims**

9. A method of loading block-like articles into an opened receptacle comprising the steps of:

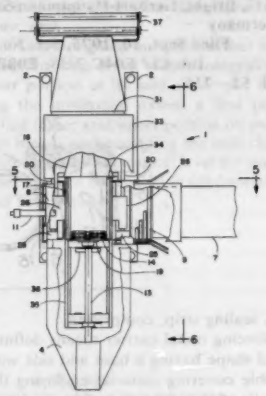
a. providing a movable loading carriage with spreader means and with conveyor bed means for receiving said article, said conveyor bed means being movable relative to said carriage;

b. applying a pulling force to the upper portion of a block-like article to pull same onto said conveyor bed;

c. at least partially opening a receptacle so that its mouth faces said article;

d. advancing said loading carriage to a position adjacent said opened receptacle;

e. spreading the mouth of said bag with said spreader means so that said article will not touch the mouth of said receptacle when placed therein; and,



f. applying a pushing force to the side of said article opposite said receptacle to push said article and conveyor bed means into the receptacle.

4,015,403

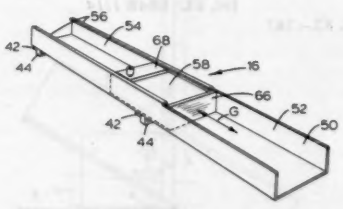
WRAP-AROUND CARTON FORMING MACHINE

Marinus J. M. Langen, Rexdale, Canada, assignor to H. J. Langen & Sons Ltd., Rexdale, Canada

Division of Ser. No. 553,269, Pat. No. 3,968,623. This application Sept. 29, 1975, Ser. No. 617,311

Int. Cl.[2] B65B *11/22*

U.S. Cl. 53—195 **3 Claims**



1. In a wrap-around carton loading and forming machine of the type wherein a carton blank is wrapped around a mandrel bucket, within which the article which is to be wrapped is located, as the mandrel bucket moves through a wrapping station, the improvement of;

a. a frame,

b. an endless conveyor mounted for movement longitudinally of said frame, said conveyor having a pair of oppositely disposed first and second side edges, a portion of said first edge extending adjacent said wrapping station,

c. a plurality of upwardly open mandrel buckets mounted on said conveyor at longitudinally spaced intervals therealong and extending transversely thereof, each of said buckets having a first portion disposed between said side edges of said conveyor and secured against lateral movement with respect to said conveyor, and a second portion projecting laterally outwardly from said first side edge of said conveyor and terminating in an outer end, said second portion providing a mandrel about which a carton blank may be wrapped in said wrapping station, said mandrel having a length extending outwardly from said first side edge of said conveyor at least equal to the length of the article to be wrapped so as to extend into said wrapping station as the mandrel buckets are moved by

said conveyor along said frame, said mandrel buckets being longitudinally spaced with respect to one another a distance sufficient to permit a carton blank to be located therebetween for wrapping about said mandrel buckets as they are moved through said wrapping station, said buckets having a U-shaped channel extending therealong so as to extend across said conveyor and into said second portion thereof to provide an article receiving chamber therein,

d. a plunger slidably mounted in the U-shaped channel of each mandrel bucket for movement therein in a direction which extends transversely of said conveyor, said plunger having a pushing end located within said channel and directed towards said outer end of said second portion, said plunger being movable between a first position in which it is disposed within said first portion of its associated mandrel bucket and spaced a substantial distance inwardly from said outer end of said mandrel bucket and a second position at or adjacent said outer end so as to discharge an article from said bucket by way of said outer end in response to movement of said plunger from said first position to said second position,

e. guide rail means disposed directly above said mandrel buckets and engaging said plunger means for moving said plunger means with respect to said mandrel buckets between said first and second positions in response to movement of said mandrel buckets with said conveyor,

f. drive means for drivingly engaging said conveyor for driving said conveyor continuously to drive said mandrel buckets continuously through said wrapping station.

4,015,404

APPARATUS FOR BUNDLING STACKS OF NEWSPAPERS

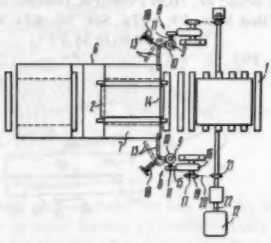
Nikolai Ivanovich Anikanov, Bolshaya Bronnaya ulitsa, 2/6, kv. 6, Moscow; Evgeny Arkadievich Baburin, Prospekt Romena Rollana, 25, kv. 264, Kiev; Leonid Pavlovich Grachev, Serafimovicha ulitsa, 2, kv. 181, Moscow; Grigory Iosifovich Zax, Mechnikova ulitsa, 14a, kv. 24, Kiev; Grigory Avramovich Radutsky, 16 Parkovaya ulitsa, 49, korpus 2, kv. 68; Mikhail Evseevich Frumkin, Naberezhnaya-Novikova-Proboya, 9, kv. 34, both of Moscow, and Rafail Efimovich Kheifets, Brest-Litovsky prospekt, 162, kv. 30, Kiev, all of U.S.S.R.

Continuation-in-part of Ser. No. 624,560, is a continuation of Ser. No. 459,346, April 9, 1974, abandoned. This application Feb. 19, 1976, Ser. No. 659,519

Claims priority, application U.S.S.R., Apr. 13, 1973, 899752

Int. Cl.² B65B *11/02*

U.S. Cl. 53—218 **2 Claims**



1. In an apparatus for bundling stacks of newspapers, comprising a feed-in rollerway for feeding stacks of newspapers, an endless driven roller conveyor for accepting stacks fed in by said rollerway, arranged downstream of the rollerway in the stack feeding direction and being adapted to be intermittently driven by an associated drive means, a detachable frame arranged above said roller conveyor, means for feeding a web of wrapping paper intermediate said frame and a stack, the width of the web of wrapping paper being somewhat greater that the width of the stack, for margins of this wrapping paper web to protrude in the areas of the end faces of the bundle-to-be, said frame being reciprocable in a vertical plane to be put over the wrapping paper onto the stack, whereby the stack becomes wrapped up at its top plane and two sides, in which way a bundle with open end faces is formed, an improvement residing in that in the stack wrapping-up zone defined by the frame and said roller conveyor there is mounted to each side of said feed-in rollerway a device for retaining newspapers in the stack from being crumpled, each said device including a bell crank pivotable about a pivot axis in a plane parallel with the feeding direction of said feed-in rollerway, one arm of said bell crank being operatively connected with the drive means of said roller conveyor, for pivoting said bell crank into two alternative positions in one of which the other, free arm of said bell crank is introduced into the area of the protruding margins of the wrapping paper web and is aligned with the lower edge of the stack, foremost in the direction of the latter's advance, for the said margins of the wrapping paper web to be guided about the said free arm as the wrapping paper web is being introduced to underlie the bottom side of the stack; in the other of said alternative positions, at the moment when the operation of introducing the wrapping paper to underlie the bottom side of the stack is nearing its completion, said free arm is retracted from under the wrapping paper web, to enable the stack to leave the roller conveyor unobstructedly, the operative connection between the first-mentioned arm of said bell crank an the drive means of said roller conveyor being such that the bell crank is driven from said second position into said first position thereof before the motion of the roller conveyor is arrested.

4,015,405

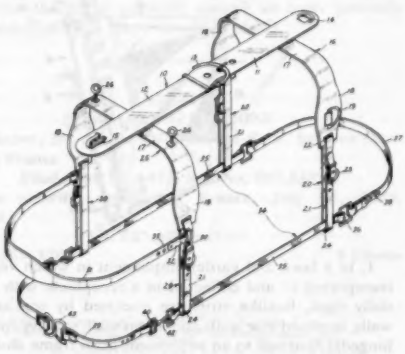
ALL PURPOSE TRAINING HARNESS

Patricia R. Westlund, 6879 E. Cholla St., Scottsdale, Ariz. 85254

Filed May 22, 1975, Ser. No. 579,920

Int. Cl.² B68B *1/00*

U.S. Cl. 54—71 **4 Claims**



1. In an all purpose training harness for horses that is adjustable to fit horses of various sizes within a wide range,

a. a top strap including two parts which are detachably connected by a buckle which provides for adjusting the length of said top strap,

b. a rear cross strap of inverted U shape comprising a substantially flat back and a pair of legs depending from the ends of said back, said back having a central portion secured to said top strap,

c. a rear strap hanger suspended from each leg and including means for adjusting its effective length,

d. a front cross strap of inverted U-shape providing a substantially flat back and a pair of legs depending from the

ends of said back, said front strap having a central portion secured to said to strap,

e. a front strap hanger suspended from each of said legs and including means for adjusting the effective length thereof,

f. a breast strap having ends attached to said front strap hangers; and

g. a body strap supported by said strap hangers and comprising:

I. two elastic side parts each presenting rear and front ends,

II. a U-shaped hind strap having ends adjustably connected to the rear ends of said side parts,

III. a U-shaped fore strap having ends adjustably connected to the front ends of said side parts; and

IV. means on said fore strap for attaching a lead line thereto; and

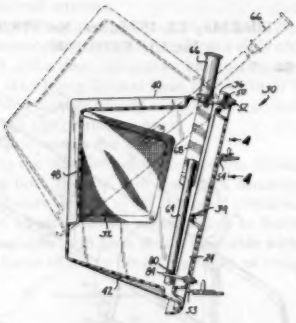
h. each leg of each cross strap being formed with a slot and each strap hanger comprising a strap loop that is passed through one of said slots with its end being adjustably connected by a buckle whereby each strap hanger includes a bend at its lower end with all of said bends receiving and supporting said body strap, and in which the elastic side parts of the body strap are slidably received in said bends and include front end portions projecting beyond the bends in which they are received.

4,015,406

LAWNMOWER BAGGING APPARATUS

Robert H. Witt, Bloomington; Herbert F. Horner, Jr., Tonka Bay, and Richard A. Thorud, Bloomington, all of Minn., assignors to The Toro Company, Minneapolis, Minn.

Filed Aug. 4, 1975, Ser. No. 601,443
Int. Cl.² A01D *35/22*
U.S. Cl. 56—202 **12 Claims**



1. In a lawn and garden implement in which vegetation is transported to and collected in a receptacle with a substantially rigid, boxlike structure enclosed by top and bottom walls, opposed side walls and a rear wall, said receptacle being hingedly fastened to an implement main frame along an edge of said top wall to permit said receptacle to pivot about a substantially horizontal axis and close against a receptacle base mounted on said main frame, a handle and latch mechanism, comprising:

a. means defining an elongated handle member;

b. means for telescopically mounting said handle member in said receptacle with a portion thereof protruding through an aperture in said top wall so that said handle member is upwardly extensible therefrom to function as a lever for pivotal emptying of said receptacle, and downwardly retractable into a handle storage position; and

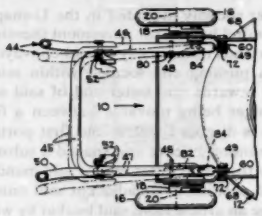
c. apertured latch means carried by said implement main frame for receiving one end of said handle in an aperture thereof when said handle member is in said storage position.

4,015,407

MOWER WITH SHOCK MOUNTS

Roger J. Bacon, Holland, Wis., assignor to FMC Corporation, San Jose, Calif.

Filed Oct. 8, 1975, Ser. No. 620,898
Int. Cl.² A01D *35/26*
U.S. Cl. 56—255 **3 Claims**



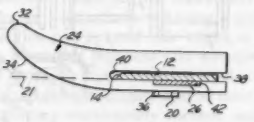
1. In a mower having a housing, wheels supporting the housing for movement over the ground, an engine, and a handle bar assembly including a pair of support arms with lower mounting ends; the improvement which comprises a first group of resilient shock mounts connecting the engine to the housing defining a first vibration barrier for minimizing engine induced vibration from being transmitted to the housing, a second group of resilient shock mounts connecting the lower ends of the handle bar arms to the housing, a pair of height adjusting braces having upper and lower ends, a third group of resilient shock mounts connecting the lower ends of the braces to the housing with the upper ends being disposed adjacent associated ones of said arms, and means connecting the upper ends of said braces to the associated ones of said arms, said second and third groups of resilient shock mounts being effective to provide a second vibration barrier for minimizing engine induced vibrations from being transmitted to the upper end of the handle bar assembly, said second and third groups of resilient shock mounts also being arranged to permit transverse movement of the upper end of the handle bar assembly relative to the housing for minimizing transmission of shock forces to the upper end of the handle bar assembly due to movement of the mower over rough ground, said third group of shock mounts being arranged to urge the upper ends of the height adjusting braces against the associated handle bar arms.

4,015,408

SAFETY GUARD FOR ROTARY-TYPE CUTTER

Maurice H. Cornellier, 7039 Pinhurst, Dearborn, Mich. 48126

Filed Mar. 29, 1976, Ser. No. 671,399
Int. Cl.² A01D *55/18*
U.S. Cl. 56—295 **9 Claims**



1. A safety guard assembly for rotary-type cutter blade adapted to rotate in a substantially horizontal plane about a vertically disposed shaft, said cutter blade having at least a portion of a leading edge with respect to the direction of rotation of said cutter blade sharpened to form a cutting edge, said safety guard assembly comprising a plurality of parallelly disposed individual guard units each formed of a non-cutting guard member disposed such as to surround said cutter blade at said cutting edge in a plane substantially perpendicular to

the plane of rotation of said cutter blade, each of said non-cutting guard members having a curvilinear lower edge extending forwardly of said cutting edge from above said plane of rotation to below said plane of rotation directly below said cutting edge, said curvilinear edge extending forwardly to a curved tip, and means for rigidly supporting said plurality of said non-cutting guard members on said cutter blade in mutually spaced relationship so as to leave exposed portions of said cutting edge between each pair of consecutive non-cutting guard members.

4,015,409

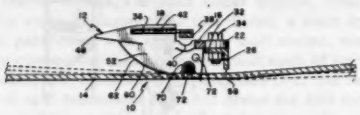
COMBINED SICKLE GUARD UNIT AND ATTACHMENT MOUNTING MEANS

Clinton F. Baker, 109 S. 8th St., Fredonia, Kans. 66736

Filed Aug. 11, 1975, Ser. No. 603,376

Int. Cl.² A01D *55/10*

U.S. Cl. 56—312 **17 Claims**



12. A unitary sickle guard unit comprising a plurality of parallelly spaced and forwardly projecting guard fingers joined integrally at their rear ends by a horizontally extending bar, said mounting bar being provided with integral means having spaced apertures therethrough for enabling the mounting of the unit on a horizontal support, and each of said guard fingers being provided with an integral medial rib depending therefrom, with said depending ribs having openings therethrough that are aligned in parallelism with and disposed at a height below that of the mounting bar.

4,015,410

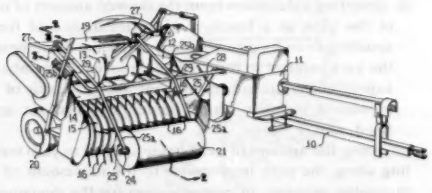
HAY OR CROP SAVING ATTACHMENT FOR MOBILE PICK-UP BALER

Palmer L. Smith, Rte. 4, Thomasville, Ga. 31792

Filed Mar. 4, 1976, Ser. No. 664,041

Int. Cl.² A01D *89/00, 83/00*

U.S. Cl. 56—364 **7 Claims**



1. In a mobile pick-up baler for hay and the like, a counter-rotating pick-up rotor having circumferentially spaced radial pick-up teeth for elevating hay from a windrow and delivering it to a transverse axis auger which feeds the hay into a side mounted bale case, the improvement which comprises a relatively large transverse axis cylinder arranged immediately in advance of said pick-up rotor, and means floatingly supporting said cylinder on the pick-up baler in such a way that the cylinder can rise relative to the pick-up rotor responsive to contact with a thick windrow and is positively prevented from falling below a certain elevation at which the bottom of the cylinder is spaced somewhat from the ground.

4,015,411

RAKING MACHINES

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland, and Ary van der Lely, 10, Weverskade, Maasland, Netherlands

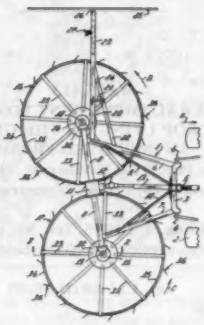
Filed Oct. 11, 1974, Ser. No. 514,309

Claims priority, application Netherlands, Oct. 12, 1973, 7314028; Feb. 18, 1974, 7402172; Jan. 18, 1974, 7400685; June 19, 1974, 7408181

The portion of the term of this patent subsequent to June 15, 1993, has been disclaimed.

Int. Cl.² A01D *79/00*

U.S. Cl. 56—366 **47 Claims**



1. A raking machine comprising a frame movable over the ground and at least one rake head supported on said frame and rotatable about an upwardly extending axis, said rake head comprising a substantially central portion and outer flexible wall means which, at least during rotation, is deflectable and extends around said axis of rotation, support means interconnecting said flexible wall means with the central portion and raking means on said wall means, said raking means being located adjacent the outer perimeter of said wall means, driving means connected to rotate said rake head and said wall means being acted upon by centrifugal forces generated during rotation thereof to normally assume an outer generally circular configuration when viewed in plan.

4,015,412

HAY-MAKING MACHINE

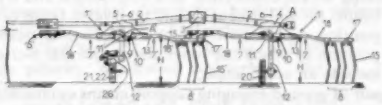
Walter Reber, 50, avenue du Marechal Foch, Saverne (Bas-Rhin), France

Filed June 16, 1975, Ser. No. 587,238

Claims priority, application France, July 18, 1974, 74.25974

Int. Cl.² A01D *79/02*

U.S. Cl. 56—370 **9 Claims**



1. A hay-making machine for windrowing, comprising at least two rake wheels driven by the energy of a motor vehicle so as to rotate in identical rotation directions about upwardly directed axes and each comprising arms carrying identical working tools, means mounting said wheels side by side on said machine, said arms extending substantially radially towards the exterior, means guiding said arms in such manner that their working tools, over a partial range of their revolution, pivot upwards and in the direction opposite to the directions of rotation of the said rake wheels, characterised in that

the distance between said axes is such that the trajectories described by the outer working tools of the rake wheels overlap between the axes of rotation of the said rake wheels, the outer working tools of one rake wheel passing above the outer working tools of the other rake wheel in the zone of overlap of the said trajectories, and in that the longitudinal axes of the tool-carrier arms cross the axis of rotation of the associated rake wheel at a point which is situated at substantially the same distance above the ground for one rake wheel as for each other rake wheel.

4,015,413

AGRICULTURAL IMPLEMENT FOR RAKING OR SPREADING CROP LYING ON THE GROUND HAVING AN IMPROVED FRAME

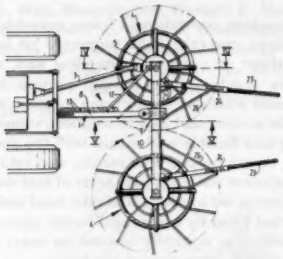
Nicolaas van der Plas, 152, Savelstraat, Sterrebeek, Belgium, and Berend Broijl, 26, Prinses Irenestraat, Kleotinge, Netherlands

Filed Aug. 19, 1975, Ser. No. 605,802

Claims priority, application Netherlands, Aug. 20, 1974, 7411126

Int. Cl.² A01D *79/00*

U.S. Cl. 56—370 **17 Claims**



1. An agricultural implement for raking or spreading crop lying on the ground, comprising in combination:

a frame adapted to be attached to a three-point lift of a tractor, said frame including a longitudinal beam disposed in trailing relation behind the three-point lift and extending in the direction of implement movement, and a transverse beam;

pivot means connecting said transverse beam between its ends to the trailing end of said longitudinal beam for povital movement about a generally vertical axis and for pivotal movement about a generally horizontal axis transverse to the axis of said transverse beam;

locking means connecting said longitudinal and transverse beams for adjustment of said transverse beam between a position perpendicular to the longitudinal beam and a position in which the longitudinal and transverse beams include an acute angle;

a pair of ground-engaging support means connected to said transverse beam, one of which is located to one side of said longitudinal beam and the other of which is located to the other side of said longitudinal beam, for following the ground contours while said transverse beam rocks about said generally horizontal axis;

a pair of rake wheels rotatably suspended below said transverse beam for sweeping through generally horizontal paths, one rake wheel being adjacent one support means and the other being adjacent the other support means; and

drive means drivingly interconnecting said rake wheels for rotation thereof by a tractor power take-off shaft.

4,015,414

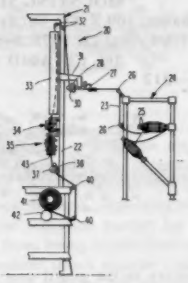
MONITORED TWIST CONTROL APPARATUS AND METHOD

William C. Sholly, Jr., Souderton, Pa., assignor to The Warner & Swasey Textile Machine Company, Gastonia, N.C.

Continuation-in-part of Ser. No. 478,599, June 12, 1974, Pat. No. 3,994,123, which is a continuation-in-part of Ser. No. 405,036, Oct. 10, 1973, abandoned. This application Feb. 20, 1975, Ser. No. 551,350

Int. Cl.² D02G *1/02*; **D01H** *13/32*; **G01L** *5/00*

U.S. Cl. 57—34 HS **33 Claims**



1. In yarn false twisting wherein yarn travles along a predetermined path and has twist applied thereto, the process of obtaining improved twist uniformity by the steps of

a. continuously applying twist to yarn travelling along its path;

b. continuously monitoring the amount of twist in yarn travelling along the path by

i. first setting the axis of an arcuately moveable member at a predetermined fixed angle with the yarn path, the fixed angle corresponding to the desired amount of twist in the yarn, and

ii. then sliding the yarn over the arcuately moveable member,

iii. detecting a deviation from the desired amount of twist in the yarn as a function of an imbalance of forces resulting from longitudinal and rotational movement of the yarn relative to the arcuately moveable member as expressed by arcuate movement about its axis of the moveable member while maintaining said set angle fixed, and

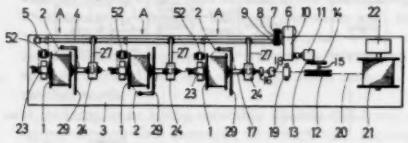
c. adjusting the amount of twist being applied to yarn travelling along the path in response to the movement of the moveable member, in compensation for the deviation in amount of twist so detected.

29. In an apparatus for applying twist of some type to yarn or the like, a means for monitoring the amount of twist in the yarn, said monitoring means including an arcuately moveable member having an axis of movement that is adapted to be fixedly disposed at a predetermined fixed angle with the yarn path, which angle corresponds to the desired amount of twist in the yarn, and with said moveable member being adapted for disposition at said angle for a sliding movement of yarn thereover, and including means for detecting a deviation from the desired amount of twist in the yarn as a function of arcuate movement of said moveable member.

4,015,415
TWISTING MACHINE

Shoji Otsuki, 25, 10-Banchi, 4-Chome, Higashi Shinmachi, Yao, Osaka; Kenjiro Kuroishi, 399-Go, 4-Ban, Nishi-1-Chome, Shiki-Cho, Yao, Osaka, and Eiji Ohara, 49, 1-Ban, 4-Chome, Kathuyamakita, Ikuno, Osaka, Osaka, all of Japan

Filed Aug. 5, 1975, Ser. No. 602,066
Int. Cl.² D07B 3/04
U.S. Cl. 57—34 R **5 Claims**

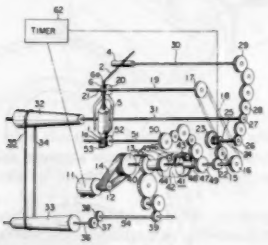


1. A twisting machine for intertwisting linear objects comprising drums wound with said linear objects, rotary shaft means for rotatably supporting said drums, a main shaft disposed in parallelism with said rotary shaft means, means for drivingly connecting said main shaft and each of said rotary shaft means, arm members each disposed over the outer periphery of said drums and rotatable about the axis thereof to draw out said linear objects from said drums, guide means for guiding said drawn linear objects into an axially inner hollow portion of said rotary shaft means, a twisting means for intertwisting said guided linear objects at a uniform angle of twist thereby to form a continuity of thick, strong rope-like object, and a means for winding thereon said continuity.

4,015,416
METHOD AND DEVICE FOR CUTTING ROVE AT DOFFING IN FLYER FRAME

Mitsuo Mori, Toyota; Katsumi Nakane, Okazaki, and Toshio Morishita, Kariya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed Feb. 27, 1976, Ser. No. 662,085
Claims priority, application Japan, Mar. 5, 1975, 50-26912
Int. Cl.² D01H 1/24, 1/26, 9/16
U.S. Cl. 57—54 **11 Claims**

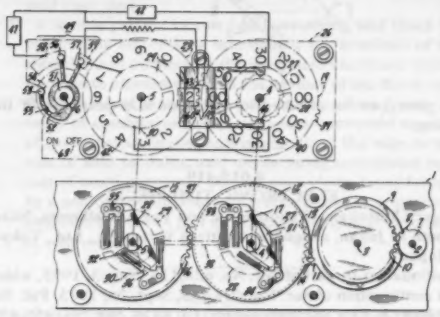


6. A flyer frame comprising a rotary flyer; a rotary bobbin on which a rove is wound due to a speed difference between the flyer and the bobbin; rove feeding rollers disposed near the flyer top; and an arrangement for driving the bobbin and the flyer with the speed difference and driving the rove feeding rollers, the driving arrangement including means for causing the rotation of the rove feeding rollers to be stopped, and means for causing the bobbin and flyer to rotate substantially at the same speed when the rotation of the rove feeding rollers is stopped.

4,015,417
ALARM TIME SETTING NOTIFYING MECHANISM FOR A CLOCK OR THE LIKE

Kiyoshi Kitai, Tokyo; Masuo Ogihara, Chiba; Kouzo Sato, Yotsukaido, and Nobuo Shinozaki, Chiba, all of Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan

Filed Apr. 7, 1975, Ser. No. 565,469
Claims priority, application Japan, Apr. 8, 1974, 49-39618
Int. Cl.² G04B 23/02, 13/02, 19/30
U.S. Cl. 58—22.7 **3 Claims**



1. In a clock of the type having an alarm device for detecting a preset alarm time and providing an audible alarm: alarm time indicating means for providing a visual indication of the preset alarm time; and alarm time setting notifying means for providing a visual indication indicative of the operative or inoperative state of said alarm device thereby notifying the user of the clock whether or not said alarm device is set to detect an alarm time, said alarm time setting notifying means comprising a manually movable selector movable to one position corresponding to the operative state of said alarm device and movable to another position corresponding to the inoperative state of said alarm device, means defining a notifying opening coacting with said alarm time indicating means to display therethrough the preset alarm time, an electrically energizeable illuminable element positioned so as to illuminate said notifying opening thereby illuminating the alarm time displayed therethrough, and switch means connected to an electric power source and connected to said selector for movement therewith and operative when said selector is moved to said one position to connect said illuminable element to said electric power source to thereby energize said element into illumination.

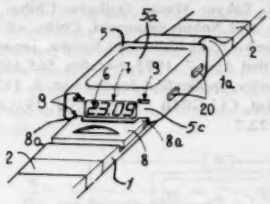
4,015,418
TIMEPIECE WITH DIGITAL TIME DISPLAY

Daniel-François Rochat, Neuchatel, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland

Filed Sept. 22, 1975, Ser. No. 615,352
Claims priority, application Switzerland, Oct. 15, 1974, 13789/74
Int. Cl.² G04C 3/00; G04B 19/00, 37/00
U.S. Cl. 58—23 R **14 Claims**

1. A timepiece having a digital time display comprising a casing having two opposite faces and a lateral wall intermediate said opposite faces, a lateral window opening through said lateral wall in which appear the indications of the display device, said casing being arranged in such a way as to be capable of occupying two different positions wherein said opposite faces are turned over, one with respect to the other, in each of which positions one or the other of said opposite faces is visible, commutation means ensuring that in one of the said positions of the casing the time indications are displayed

in one direction, while in the other position of the casing they are displayed in the opposite direction, so that the reading of



the time can be effected in either of said positions of the casing.

4,015,419

ELECTRONIC TIMEPIECE

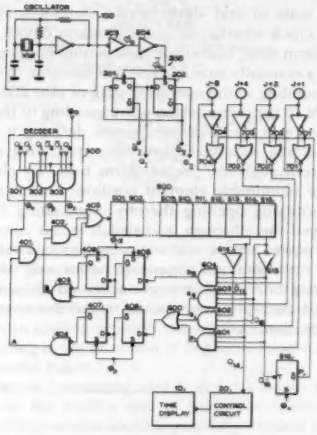
Shigeru Morokawa, Tokorozawa, and Yukio Hashimoto, Niiza, both of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 628,150, Nov. 3, 1975, which is a continuation of Ser. No. 401,118, Sept. 26, 1973, Pat. No. 3,916,612. This application Feb. 13, 1976, Ser. No. 658,037

Claims priority, application Japan, Oct. 2, 1972, 47-098766; May 21, 1973, 48-056444

Int. Cl.² G04C *3/00*

U.S. Cl. 58—23 R **10 Claims**



1. An electronic timepiece comprising:

a constant-frequency pulse generator;

circuit means connected to said generator for deriving therefrom a basic pulse train and at least one ancillary pulse train, said pulse trains having spacedly interleaved pulse positions;

a multistage frequency divider with high-frequency input means and low-frequency output means;

logical summing means connected to said circuit means for additively combining said pulse trains into a succession of driving pulses fed to said input means;

pulse-responsive means connected to said output means for receiving therefrom a low-frequency pulse sequence stepped down from said succession of driving pulses;

time-indicating means connected to said pulse-responsive means for being driven by said pulse sequence; and

control means selectively operable to suppress said ancillary pulse train, thereby decelerating the drive of said time-indicating means.

4,015,420

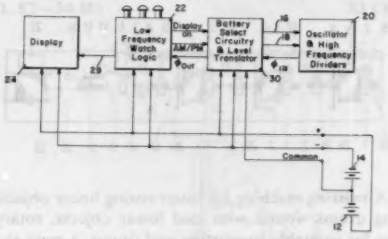
BATTERY SELECT CIRCUITRY AND LEVEL TRANSLATOR FOR A DIGITAL WATCH

Dennis E. Walker, Costa Mesa, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed May 3, 1976, Ser. No. 682,431

Int. Cl.² G04C *3/00*

U.S. Cl. 58—23 BA **5 Claims**



1. A method for increasing the battery life of the batteries in a digital watch with batteries, an oscillator, high frequency dividers and display devices which comprises:

a. connecting only one of first and second batteries to power the digital watch's oscillator and high frequency dividers when the watch's display elements are not activated;

b. connecting said first and second series connected batteries to both power the digital watch's oscillator, high frequency dividers and display devices when the watch's display elements are activated;

c. switching said batteries at predetermined time periods, thereby connecting said first battery to the digital watch's oscillator and high frequency dividers during one time period and then connecting said second battery to the digital watch's oscillator and high frequency dividers during another substantially equal time period.

4,015,421

MAINSPRING MECHANISM AND SPRING BARREL ASSEMBLY

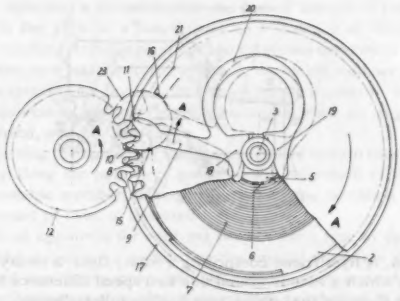
Kurt Mürrle, Pforzheim, Germany, assignor to Pforzheimer Uhren-Rohwerke Rudolf Wehmer, Pforzheim, Germany

Filed Dec. 15, 1975, Ser. No. 640,445

Claims priority, application Germany, Jan. 23, 2502562

Int. Cl.² G04B *1/16*

U.S. Cl. 58—86 **8 Claims**



4. In a watch, a mainspring mechanism comprising

a barrel bridge,

a barrel arbor rotatably mounted in said barrel bridge

a spring barrel rotatably mounted on said barrel arbor,

a spring core non-rotatably connected to said barrel arbor and surrounding the same,

a coiled spring disposed in said barrel and having an inner end secured to said spring core and an outer end secured to said barrel,

a ratchet wheel disposed between said main spring and said barrel bridge and non-rotatably connected to said spring core and formed with ratchet teeth,

first and second stops carried by said bridge and spaced apart in the peripheral direction of said ratchet wheel,

a winding wheel having winding wheel teeth which are in mesh with said ratchet teeth and protrude from said ratchet teeth on the side remote from said spring, and a locking lever which is disposed between said first and second stops on that side of said ratchet wheel which is remote from said spring and is frictionally coupled to said spring core and has locking tooth means adjacent to said ratchet teeth,

said locking lever being movable against the force of said spring from a first position, in which said locking lever engages said first stop and said locking tooth means interengage with said winding wheel teeth, to a second position, in which said locking lever engages said second stop and said locking tooth means are disengaged from said winding wheel teeth.

4,015,422

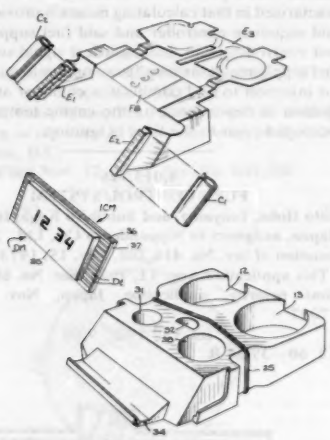
SOLID-STATE ELECTRONIC WATCH ASSEMBLY

Egbert Van Haaften, Closter, N.J., assignor to Bulova Watch Company, Inc., New York, N.Y.

Filed June 2, 1975, Ser. No. 582,924

Int. Cl.² G04B *37/00*

U.S. Cl. 58—88 R **8 Claims**



1. In a solid state electronic watch provided with a generally rectangular case having a window formed on one end thereof, and an assembly receivable within said case, said assembly comprising:

A. an insulating block having a ledge projecting from the forward section thereof adjacent said one end of the case, said block having cavities therein to accommodate discrete elements, including a cavity in the rear section of the block to receive a battery cell,

B. an electro-optic display module formed by a chip constituted by a group of digital display stations mounted on a rectangular board on whose fact at either edge thereof is an array of terminals for applying drive signals to the stations;

C. an integrated electronic circuit module formed by an integrated circuit chip mounted on a like board on whose face at either edge thereof is an array of corresponding terminals, said integrated electronic circuit being constituted by a high-frequency standard whose output is applied to a divider to produce low-frequency timing pulses and a display actuator responsive to said pulses, said frequency standard being constituted by an oscillator operating in conjunction with a quartz crystal unit, which is one of the discrete elements received in one of said cavities, said electronic circuit, when energized, functioning to generate said drive signals, said modules being mounted in back-to-back relation on said ledge, with the display stations exposed to view through the window of said case, and

D. a flexible printed circuit board overlying said block for electrically interlinking interlinking the terminals of the modules and connecting the integrated electronic circuit to discrete elements held in the cavities of the block, said flexible board including a pair of extensions having an array of conductive lines, and means connected to some of said lines to engage and interconnect the edge terminals of said modules, said means being constituted by a pair of multi-connector clamps, each clamp being formed by a pair of flexible tines which are adapted to engage and electrically shunt a pair of corresponding edge terminals of said modules.

4,015,423

METAL STRAPS FORMED BY INTERCONNECTED LINKS

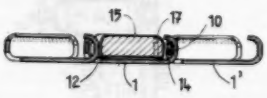
Patrick J. C. Brunet, Annecy, France, assignor to Zuccolo, Rochet & Cie, Annecy, France

Filed Oct. 29, 1974, Ser. No. 518,756

Claims priority, application France, Oct. 30, 1973, 73.40371

Int. Cl.² F16G *13/18*

U.S. Cl. 59—82 **6 Claims**



1. A metal strap, particularly a strap for a wrist-watch, comprising links each of which consists of a link frame in the form of a generally rectangular box with a top and four sides turned over towards an underside of the strap to define an open bottom of the link frame, each link frame having on one side at least one substantially rectangular aperture leaving a free edge part of said side which forms a cross-pin, and, projecting from the side opposite said one side, at least one corresponding integral hook which passes through a corresponding said aperture in an adjacent link frame and pivotally engages about the corresponding cross-pin, and link bases each engaged in the open bottom of a link frame to hold the adjacent link frames together, each link base having on one edge at least one boss which holds captive the cross-pin of an adjacent link frame in the corresponding hook of the link frame and, on an opposite edge, means defining at least one recess which leaves a free passage for the hook of another adjacent link frame accommodating the cross-pin of the link frame in which said link base is fitted.

4,015,424

COMBUSTION ENGINE WITH DUAL FUNCTION MOTOR ELEMENT AND ROTARY VALVE FOR CYCLICAL FUEL AND EXHAUST METERING

Sakuta Shinohara, No. 52-6, 1-chome, Hohnan, Suginami, Tokyo, Japan

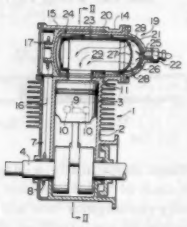
Filed Apr. 11, 1975, Ser. No. 567,191

Int. Cl.² F02G *3/00, 3/02*

U.S. Cl. 60—39.6 **3 Claims**

1. In a combustion powered engine, an apparatus for effecting combustion of fuel gas comprising means for volumetrically compressing a mixture of air and fuel homogeneously

mixed without stratification, including an operating member disposed within a casing and movable therein to cause volumetric compression of said mixture and volumetric expansion of combustion gas, means defining a cylindrical volume, means forming an introducing part through which said compressed mixture can be fed from said casing into said cylindrical volume, means defining a mixture chamber where a flow of said mixture can be established along an outer annular layer portion of said cylindrical volume concentric with said cylindrical volume in a direction away from said introducing part, means for receiving said mixture flow and effecting continuous combustion of the mixture by heat radiated from a hot surface and provided at a position within said cylindrical volume and remote from said introducing part, said cylindrical volume defining means including a cylindrical combustion tube provided adjacent of said casing, said mixture chamber defining means including a cylindrical convection tube provided within said cylindrical combustion tube concentrically therewith so as to leave said chamber between the inner peripheral wall surface of said cylindrical combustion tube and the other peripheral wall surface of said cylindrical convection tube, said convection tube having an end open to said mixture chamber, said continuous combustion effecting means including a heat radiation plate provided within said convection tube concentrically therewith so as to divide the inside of the convection tube into a combustion chamber which is in communication with said mixture chamber through said opening end of said convection tube and a combustion gas chamber, said heat radiation plate being heated by combustion gas in said combustion chamber, whereby the resultant heat accumulated therein radiates into said combustion chamber to ignite fuel and air mixture introduced into said combustion chamber, combustion gas chamber ports provided in said heat radiation plate, said introducing part forming means including an aperture provided in the wall of said combustion tube to allow said mixture chamber to communicate with said casing, and outlet part forming means comprising an aperture provided in the wall of said convection tube to allow said combustion gas chamber to communicate with said casing, and including a rotary valve provided concentrically with said combustion tube to serve to allow compressed mixtue to be introduced into said mixture chamber through said aperture of said combustion tube from said casing only when said operating member in said casing is in an ending portion of its compression stroke and to allow combustion gas to flow into said casing through said aperture of said convection tube from said combustion gas chamber only when said operating member in said casing is in an initial portion of its expansion stroke, whereby a constant pressure can be maintained in said fuel and air mixture chamber.

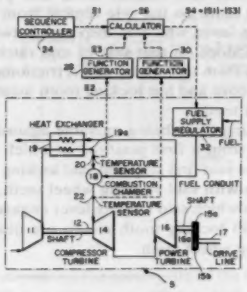


4,015,425

GAS TURBINE ENGINE FUEL CONTROL SYSTEM

Takane Itoh, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed July 9, 1974, Ser. No. 486,850
Claims priority, application Japan, July 10, 1973, 48-77728
Int. Cl.² F02C 9/08
U.S. Cl. 60—39.28 T **2 Claims**



1. A gas turbine engine fuel feed control system, the turbine engine having a compressor, a heat exchanger, a combustion chamber, a compressor turbine, a power turbine, a fuel supply regulator connected between said combustion chamber and a fuel tank, a sequence controller generating a first electrical signal therefrom and controlling said fuel supply regulator in accordance with a preselected schedule,

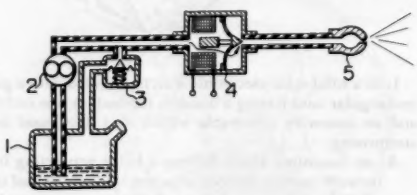
characterized in that calculating means is provided between said sequence controller and said fuel supply regulator, and controlling said first electrical signal such that said fuel supply regulator supplies an optimum quantity of fuel for injection to said combustion chamber at the time of ignition in dependence on the engine temperature as it exists just prior to the time of ignition.

4,015,426

FUEL CONTROL SYSTEM

Nobuhito Hobo, Inuyama, and Sumihiro Kaga, Inazawa, both of Japan, assignors to Nippondenso Co., Ltd., Japan

Continuation of Ser. No. 416,280, Nov. 15, 1973, abandoned. This application Aug. 11, 1975, Ser. No. 603,512
Claims priority, application Japan, Nov. 20, 1972, 47-117047
Int. Cl.² F02C 9/08
U.S. Cl. 60—39.28 R **5 Claims**



1. A fuel control system for a gas turbine engine which has a fuel feed pump and an injection nozzle, comprising:

a. electromagnetic valve means including first and second systems of electromagnetic valves inserted, in parallel with each other, between said fuel feed pump and said injection nozzle;

b. a control voltage generator for generating a control voltage corresponding to a predetermined fuel metering characteristic of said gas turbine engine, said control voltage generator including:

first detecting means for generating a first control voltage responsive to engine rotational speed,

second detecting means for generating a second control voltage responsive to engine load,

selector means connected to said first and second detecting means for selecting one of said two control voltages;

c. a trigger signal generator for generating a trigger signal having a predetermined period;

d. a timing pulse generator connected to said control voltage generator and to said trigger signal generator for alternately generating first and second timing pulse signals each time said trigger signal is generated, the pulse width of said first and second timing pulse signals varying in accordance with said control voltage; and

e. an amplifier connected to said timing pulse generator for amplifying said timing pulse signals and applying the amplified signals to said first and second systems to alternately actuate said first and second systems of electromagnetic valves in said electromagnetic valve means whereby fuel is supplied smoothly to said gas turbine engine.

4,015,427

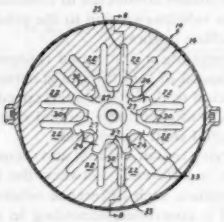
FUEL GRAIN FOR SPHERICAL BOOST-SUSTAIN ROCKET MOTOR

William T. Brooks, Waco, Tex., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 12, 1975, Ser. No. 631,280

Int. Cl.² F02K *9/04*

U.S. Cl. 60—253 **1 Claim**



1. In a spherical solid rocket motor for delivering boost-sustain operation having a rocket motor casing; a thrust nozzle, a fuel grain igniting means, a fuel grain within said rocket motor casing, comprising: an internal cavity formed by a plurality of regressively burning star point first segments and a plurality of second segments, having parallel side walls, positioned between the star point segments and extending into the cavity a greater distance than the star point segments; said second segments having side walls substantially parallel to the side walls of the star point segments; said second segments having means, including the parallel side walls, for providing a large burning surface and a sharp transition from boost to sustain operation; means, for providing a plurality of radially extending slots at the forward end of said fuel grain; and means for providing an unrestricted burning area at the end of the fuel grain adjacent the thrust nozzle.

4,015,428

FUEL CONTROL APPARATUS FOR AN AUTOMOBILE ENGINE EQUIPPED WITH AN ELECTRONICALLY CONTROLLED FUEL INJECTION SYSTEM AND AN EXHAUST GAS PURIFYING SYSTEM

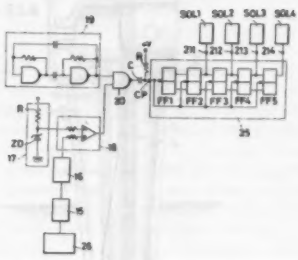
Mitsuo Kawai, Toyoda, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyoda, Japan

Filed July 15, 1974, Ser. No. 488,660

Claims priority, application Japan, Mar. 13, 1974, 49-17390

Int. Cl.² F02B *75/10*

U.S. Cl. 60—277 **4 Claims**



1. In a fuel control apparatus for an automobile engine equipped with an electronically controlled fuel injection system; and a catalytic exhaust gas purifying system, said fuel injection system including a plurality of sensors to detect the operating conditions of said automobile engine and changes in the weather and transmit signals to an electronic computer, said computer including means to determine the optimum timing and rating of fuel injection in accordance with said signals received from said sensors, a plurality of fuel injection nozzles each associated with at least one of a plurality of cylinders of said engine, and means for supplying fuel under pressure from a source of fuel supply to each of said fuel injection nozzles, said means for supplying including a plurality of fuel distributing pipes each leading to one of said fuel injection nozzles, wherein the improvement comprises:

a plurality of solenoid valves, each provided in one of said fuel distributing pipes, to supply fuel to one of said fuel injection nozzles upon opening and discontinue supply of fuel thereto upon closure;

means for generating and transmitting a signal when the temperature of said purifying system exceeds a predetermined level, including an AND gate for gating a control pulse and a condenser and resistor to differentiate said control pulse, thereby producing the transmitted signal; and

electric control means including a multiplexer responsive to said differentiated control pulse to selectively close said solenoid valves and stop the selective closing of said solenoid valves holding the condition that one of said solenoid valves is closed and the others of said valves are opened when the temperature of said purifying system is lower than a predetermined level.

4,015,429
OUTBOARD MOTOR FOR REDUCING EXHAUST GAS POLLUTANTS

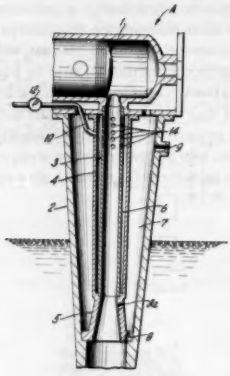
Heinz Pichl, Uppsala, Sweden, assignor to AB Volvo Penta, Goteborg, Germany

Continuation-in-part of Ser. No. 507,870, Sept. 20, 1974, abandoned, which is a continuation of Ser. No. 290,698, Sept. 20, 1972, abandoned. This application Sept. 29, 1975, Ser. No. 617,653

Claims priority, application Sweden, Sept. 20, 1971, 11843/71

Int. Cl.² F01N 3/10

U.S. Cl. 60—298 6 Claims



1. An outboard motor comprising an engine arranged to be located above the water level, a generally vertically extending exhaust gas tube having an upper end and a lower end with the upper end connected to said engine and said exhaust gas tube and extending downwardly from the engine with its lower end positioned below the water level, a tubular shaped wall laterally enclosing and spaced outwardly from said exhaust gas tube and extending for the axial length of said exhaust gas tube and forming an annular space about said exhaust gas tube with the upper and lower ends of the annular space being closed, a tubular member located within the annular space and laterally enclosing said exhaust gas tube for at least a major portion of the axial length of the said exhaust gas tube from the upper end toward the lower end thereof, said tubular member spaced radially outwardly from said exhaust gas tube and the lower end of said tubular member being connected to said exhaust gas tube, said tubular member being spaced radially inwardly from said tubular shaped wall and dividing said annular space into an inner annular insulating space between said exhaust gas tube and said tubular member from the upper end of said tubular member to the location of its connection to said exhaust gas tube with the insulating space being closed at its upper and lower ends, and an outer annular space laterally enclosing said insulating space for the axial length thereof, means for circulating a liquid through said outer annular space, and means for supplying air into said inner annular insulating space and for directing air from said inner annular insulating space into said exhaust gas tube adjacent the upper end thereof for supplying oxygen into said exhaust gas tube for aiding in the combustion of unburned components in the exhaust gases within said exhaust gas tube.

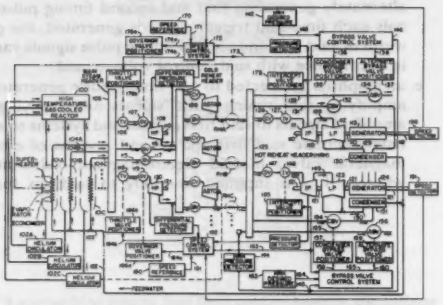
4,015,430
ELECTRIC POWER PLANT AND TURBINE ACCELERATION CONTROL SYSTEM FOR USE THEREIN

Andrew S. Braytenbah, Pennsauken, N.J., and Karl O. Jaegtnes, Chester, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 30, 1975, Ser. No. 618,098

Int. Cl.² F01K 13/02

U.S. Cl. 60—644 26 Claims



1. An electric power plant having a steam generator which includes a superheat section for generating superheat steam, and a reheat section for reheating steam, comprising,

a turbine-generator, said turbine-generator comprising a high pressure turbine portion connected to pass a first steam flow from an outlet of the superheat section to an exhaust of said high pressure portion, and a lower pressure turbine portion connected to pass a second steam flow from an outlet of the reheat section to an exhaust of said lower pressure portion, said high and lower pressure turbine portions being shaft coupled to drive an electric generating means,

first bypass means connected to conduct steam from the outlet of the superheat section to the exhaust of said high pressure turbine portion,

means for conducting steam from the exhaust of said high pressure turbine portion to an inlet of the reheat section,

second bypass means connected to conduct steam from the outlet of the reheater section to the exhaust of the lower pressure turbine portion,

means for generating a first signal representative of a desired shaft speed of said turbine-generator,

means connected to detect the shaft speed of said turbine-generator and to generate a second signal representative of the detected shaft speed, and

means for varying one of the first and second steam flows in response to a difference between the first and second signals to reduce such difference whereby the detected shaft speed is controlled according to the desired shaft speed, and for governing at a substantially constant level that one of the first and second steam flows which is not varied for purposes of controlling the shaft speed.

4,015,431
FLOATABLE OIL FENCE

Isami Ahiko, Chofu, Japan, assignor to Suzuei Co. Ltd, Japan

Filed Mar. 29, 1974, Ser. No. 456,379

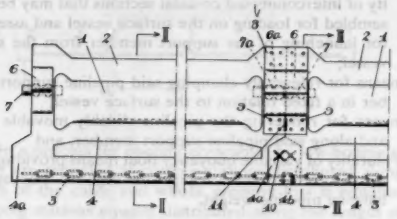
Claims priority, application Japan, Apr. 2, 1973, 48-38854[U]

Int. Cl.² E02B 15/04

U.S. Cl. 61—1 F 7 Claims

1. In a floatable boom, elongated tubular means for containing air under pressure so as to be rendered floatable, upper fin means fixed to and extending longitudinally along said tubular means, said upper fin means extending upwardly from said

tubular means for opposing the movement of water and material floating thereon over said tubular means, lower fin means fixed to and extending longitudinally along said tubular means, said lower fin means extending downwardly from said tubular means for opposing the movement of the surface of a body of water and any material thereon beneath said tubular means, and elongated partition means situated in the interior of and extending longitudinally along said tubular means for dividing the interior thereof into a plurality of longitudinally extending chambers, said partition means preventing said



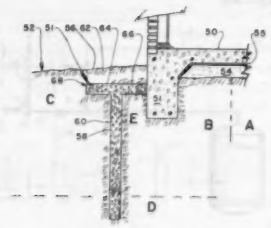
chambers from communicating with each other so that in the event of rupture of said tubular means at one of said chambers, said tubular means will nevertheless remain afloat, said tubular means and upper and lower fin means being in the form of a plurality of sections joined in end-to-end relation, each section terminating in a pair of end walls carrying pipes which pass through said end walls and respectively communicate with said chambers, and the pipes of each section communicating with the pipes of adjoining sections so that the chambers of the several sections communicate with each other through said pipes.

4,015,432

STABILIZING SUBSOIL MOISTURE UNDER LIGHT STRUCTURES

Henry F. Ball, 116 Reaves Court, Euless, Tex. 76039

Filed Dec. 26, 1974, Ser. No. 536,548
Int. Cl.³ E02D *3/00*
U.S. Cl. 61—35 **17 Claims**



1. In a method of constructing a light structure on a high shrink-swell soil having the steps of preparing the soil for pouring of a slab-type foundation; constructing a form for the foundation, placing sand within the form to provide a cushion for supporting the slab; placing structural steel within the form; pouring concrete material into the form and allowing the concrete material to harden to construct a slab; erecting a structure on the slab; and the improvement which comprises the steps of:

adding selective quantities of water to the soil until the moisture content is at least equal to the plastic limit in the area over which the slab is to be constructed; and

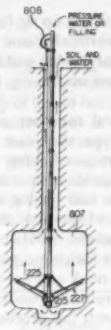
constructing a moisture-controlling barrier of a predetermined width and depth in the soil and abutting the periphery of the slab whereby capiliary movement of moisture from under the slab soil surrounding the slab is inhibited and whereby movement of water by percolation into the soil under the slab is permitted, the step of constructing the moisture-controlling barrier comprising forming a trench abutting the periphery of the slab; filling the trench with aggregate material having a minimum particle dimension in excess of ¼ of an inch.

4,015,433

METHOD FOR SETTLING ANCHORING DEVICE IN THE GROUND

Mituo Shibata, No. 15-3, Oshima 2-Chome, Kawasaki, Kanagawa, Japan

Division of Ser. No. 537,159, Dec. 30, 1974, Pat. No. 3,935,912, which is a continuation of Ser. No. 350,841, April 13, 1973, abandoned.
This application Nov. 19, 1975, Ser. No. 633,193
Int. Cl.³ E02D *5/44, 5/54*
U.S. Cl. 61—53.6 **7 Claims**



1. A method for settling an anchoring device in a shaft based in the ground, said anchoring device comprising:

a vertical tubular rod; a plurality of support arms, one end of each support arm being connected with a lower part of the tubular rod so that said support arm is turnable about the connected end in a vertical plane including an axis of said tubular rod; a plurality of fluke blades one of which is mounted on each support arm, to constitute cutting arms; means for urging said cutting arms to outwardly turn about said connected ends of said support arms from a folded state in which said cutting arms are brought together about said tubular rods; means for stationarily supporting one end of said urging means on a part of said tubular rod; holding means for releasably restraining said cutting arms in the folded state, said holding means having a line means to release the restraint of said cutting arms above the ground surface, and; means for limiting the turn of said cutting arms to a selected angle from said folded state;

said shaft having a smaller diameter than the distance defined by said cutting arms when opened to said selected angle;

said method comprising at least the processes of:

folding the cutting arms by means of the holding means having the release line;

pulling said release line of said holding means when said anchoring device reaches a bottom of said shaft;

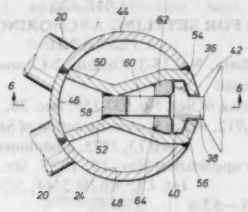
providing rotational motion to said cutting arms lying against the inner wall of said shaft from above the ground by means of an ordinary boring machine for a predetermined time; and

lifting said anchoring device while said cutting arms rotate at a preselected height so that a cavity engageable with said cutting arms of said anchoring device is formed in said bottom of said shaft.

4,015,434
LEG AND GUIDE CONSTRUCTION FOR USE IN JACKUP BARGES

D. Jarratt Tarrant, Houston, Tex., assignor to Scandril Offshore, Inc., Houston, Tex.

Filed Oct. 22, 1975, Ser. No. 624,719
Int. Cl.² E02B 17/02
U.S. Cl. 61—91 6 Claims



1. For use in a leg of a jack up rig for use in off shore oil well drilling operations, a vertical frame member adapted to be positioned at a corner of the leg and further adapted to cooperate with a guide means on the rig, the frame member comprising:

an elongate structural member of circular cross section which includes a parallel slot means on the exterior thereof, said slot means having a width sufficient to enable insertion of a guide means supported by a jack up rig into the slot means and having a length at least equal to the desired length of travel of the leg relative to the rig;

an undercut adjacent to said slot means which extends parallel thereto for locking a guide means therein which guide means has a neck and a wider portion supported by the neck and wherein said undercut and said slot means are profiled to match the profile of the guide means;

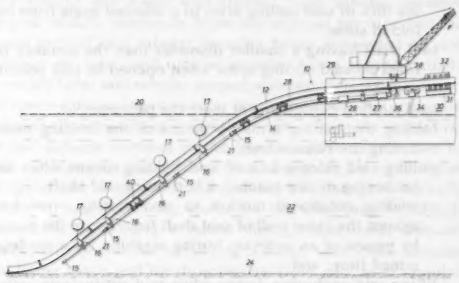
a rack of teeth supported by said structural member on the interior of said elongate structural member and facing said slot means, said slot means and said teeth forming a means for receiving a drive gear inserted into the teeth for imparting axial movement to said structural member; and

wherein the circular cross section surrounds said rack which is joined thereto by means positioned axially of said structural member and joined to said rack.

4,015,435
MARINE PIPELAYING APPARATUS

Clarence W. Shaw, Metairie, La., assignor to J. Ray McDermott & Co., Inc., New Orleans, La.

Filed Jan. 30, 1975, Ser. No. 545,526
Int. Cl.² B63B 35/04
U.S. Cl. 61—108 11 Claims



1. A marine pipelaying apparatus for laying pipeling on a submerged surface in a body of deep water from a vessel floating on the surface of the body of water and adapted to be transported between different locations on board the surface vessel and launched therefrom, comprising:

a bendable, non-articulated pipeline support member, self-supporting over its entire length, secured to and extending from the rear of the surface vessel into water for supporting the pipeline in a profile that is within the elastic limit of the pipe,

said pipeline support member having a tapered configuration wherein the upper portion of the support member secured to the surface vessel is of a larger cross section than is the unsecured lower end, and comprising a plurality of interconnected co-axial sections that may be disassembled for loading on the surface vessel and assembled for launching of the support member from the surface vessel;

means for releasably clamping said pipeline support member in a fixed relation to the surface vessel;

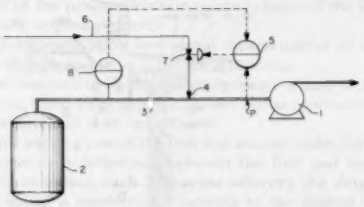
means for rendering the pipeline slidably movable above and along said pipeline support member; and

a plurality of variable buoyancy float means providng buoyancy forces to reduce pipeline negative buoyancy to balance pipeline weight.

4,015,436
METHOD FOR CONTROLLING THE CAPACITY OF A BLOWER AND A DEVICE FOR CONTROLLING THE PRESSURE IN A LIQUEFIED GAS STORAGE TANK UTILIZING SAID METHOD

Masao Seki, Tokyo, Japan, assignor to Tokyo Gas Company Limited, Tokyo, Japan

Filed July 30, 1975, Ser. No. 600,482
Int. Cl.² F17C 7/02
U.S. Cl. 62—48 2 Claims



1. An apparatus for controlling the pressure in a liquefied gas storage tank so as to maintain it substantially constant, comprising a gas blower, a boil-off gas discharging tube connected between the storage tank and said blower, liquefied gas injection means in said boil-off gas discharging tube on the suction side of said blower, a control valve in said injection means, a temperature controller coupled between said control valve and said gas discharging tube on the suction side of said blower for opening said control valve according to the difference between a set temperature and a sensed temperature and a pressure controller coupled between said temperature controller and said gas discharging tube adjacent said storage tank for sensing the pressure of gas in said tank and setting the temperature of said temperature controller at which said temperature controller actuates said control valve according to the pressure in said storage tank.

4,015,437
PROCESS FOR COOLING CRYOCABLES USING A HYDROGEN SLUSH

Wolfgang Daus, Frankfurt am Main-Hochs, Germany, assignor to Messer Griesheim GmbH, Frankfurt am Main, Germany

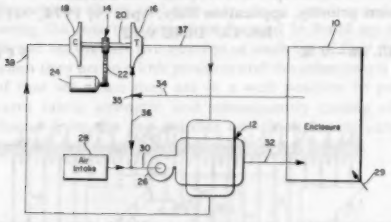
Filed May 13, 1975, Ser. No. 576,987
Claims priority, application Germany, May 15, 1974, 2423609
Int. Cl.³ F25C 1/00; H01B 9/06
U.S. Cl. 62—76 1 Claim

1. In a process for cooling cryocables by low-boiling gases, which are recooled at cooling stations distributed along the length of the cable and whose pressure loss is equalized at pumping stations equally distributed along the length of the cable, the improvement comprising producing a slush of the low-boiling gas and using the slush as the coolant at each cooling station by allowing liquid or gas under high pressure to expand in a nozzle alternately to a pressure below the pressure of the triple point thereby producing ice and subsequently to a pressure above the pressure of the triple point thereby producing liquid.

4,015,438
AIR CYCLE AIR CONDITIONING SYSTEM FOR VEHICLES

Robert C. Kinsell, Los Angeles; James C. Noe, Canoga Park, and John P. Byrne, Westminster, all of Calif., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Aug. 29, 1975, Ser. No. 609,128
Int. Cl.³ F25B 9/00
U.S. Cl. 62—88 16 Claims

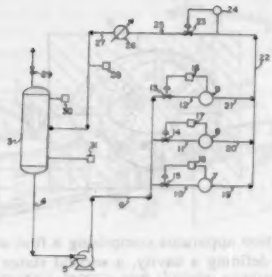


1. In combination:
an enclosure to be cooled;
a source of air at substantially ambient pressure;
a heat exchanger having first and second air passages;
blower means for propelling air from the source through the first passage of the heat exchanger for cooling and into the enclosure;
means for directing at least a portion of the air from the enclosure to a turbine means for lowering the temperature and pressure of the air;
means for directing the air from the turbine means through the second passage of the heat exchanger for removal of heat from the exchanger; and
compressor means for increasing the pressure of air from the second passage of the heat exchanger for expulsion.

4,015,439
COOLING PROCESS FOR SUBAMBIENT AND ABOVE AMBIENT TEMPERATURES

Sidney Simon Stern, New York, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed June 2, 1975, Ser. No. 583,345
Int. Cl.² F25B 1/00
U.S. Cl. 62—114 8 Claims

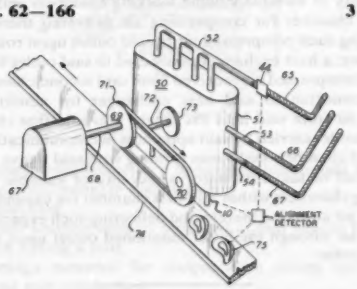


1. A method of providing cooling at above ambient temperature comprising, in a closed system having an evaporation zone, providing a supply of liquid refrigerant suitable to obtain a first variable temperature level of above ambient cooling, passing said refrigerant from said supply through said evaporation zone, condensing effluent vapor from said evaporation zone at a second variable temperature level of an available cooling medium and returning said condensed refrigerant to said supply, while maintaining said first variable temperature level constant at a level above said second variable temperature of the available cooling medium.

4,015,440
APPARATUS FOR DEPOSITING CARBON DIOXIDE SNOW

Victor F. Pietrucha, Kearny; Michael E. Minard, Basking Ridge, and Gordon J. Ozmec, Berkeley Heights, all of N.J., assignors to Airco, Inc., Montvale, N.J.

Division of Ser. No. 523,385, Nov. 13, 1974, Pat. No. 3,932,155. This application July 14, 1975, Ser. No. 595,821
Int. Cl.² F25D 3/12
U.S. Cl. 62—166 3 Claims

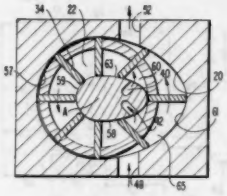


1. Apparatus for depositing carbon dioxide snow onto items to be refrigerated comprising a plurality of snow horn means for receiving liquid carbon dioxide and emitting said snow therefrom; valve means for selectively enabling passage of liquid carbon dioxide to said plurality of snow horn means; means for translating said items; means for translating said snow horn means into alignment with corresponding ones of said items; means for detecting said alignment; and means responsive to detection of said alignment for operating said valve means to enable passage of said liquid carbon dioxide to said snow horn means aligned with said items whereby said snow is deposited onto corresponding ones of said items.

4,015,441
REFRIGERATION APPARATUS

Sylvia J. Robinet, 404, 6505 Huntridge Hill, NW., Calgary, Alberta, Canada T2K 5E5

Filed Mar. 10, 1976, Ser. No. 665,531
Int. Cl.² F25D 9/00; F01C 1/30, 11/00; F03C 3/00
U.S. Cl. 62—402 11 Claims



1. Refrigeration apparatus comprising a first stator having an inner wall defining a cavity, a second stator within said cavity and having an outer wall spaced from the inner wall of said first stator, one of said cavity and said second stator being at least in part non-circular in cross section, a rotor including a sleeve within said cavity and rotatable about a fixed axis, said rotor defining a first chamber within said cavity between said sleeve and the inner wall of said first stator and a second chamber within said cavity between said sleeve and the outer wall of said second stator, said sleeve having a plurality of circumferentially spaced slots, a plurality of vanes carried by said rotor for sliding movement in said slots along respective radii of said sleeve, said vanes being substantially equal in length between their respective radially inner and outer edges, the inner and outer walls of said first and second stators respectively being spaced one from the other such that the linear distance therebetween along any radius from said axis of rotation is substantially equal to the length of said vanes, said vanes being slidable radially, upon rotation of said rotor through at least part of each revolution thereof, whereby the outer and inner edges of said vanes are maintained in substantially continuous engagement with the walls of the first and second stators respectively, an inlet carried by said apparatus for delivering air into said second chamber, an outlet carried by said apparatus in communication with said second chamber, said vanes forming with said sleeve and said second stator a plurality of variable volume working chambers within said second chamber for compressing air delivered thereto and delivering such compressed air to said outlet upon rotation of said rotor, a heat exchanger connected to said outlet for cooling the compressed air received from said second chamber, an inlet connected to said heat exchanger for admitting the cooled air from said heat exchanger into said first chamber, and an outlet carried by said apparatus in communication with said first chamber, said vanes forming with said sleeve and the inner wall of said first stator a plurality of variable volume working chambers within said first chamber for expanding and cooling air admitted thereto and delivering such expanded and cooled air through the latter mentioned outlet upon rotation of said rotor.

4,015,442
HOUSEHOLD REFRIGERATOR HAVING A DOOR COOLING APPARATUS

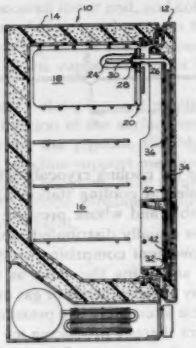
Frank A. Schumacher, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed June 5, 1975, Ser. No. 583,919
Int. Cl.² F25D 19/00
U.S. Cl. 62—449 4 Claims

1. In a household refrigerator having an outer door, a freezing compartment, and a freezing compartment door, door cooling apparatus comprising:

a closed heat pipe system including a generally elongate probe and a cooling portion, and containing a heat transfer medium;

the freezing compartment door having an opening therein for receiving said probe, and a deflectable sealing element attached adjacent the opening, said sealing element being constructed to seal the annulus between said probe and the freezer door opening in the presence of said probe and to seal the freezer door opening in the absence of said probe;



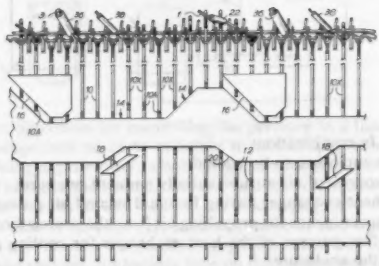
said probe extending outwardly from the interior of the outer door generally perpendicular thereto and being of curvilinear configuration with the curvature determined by the arcuate pathway followed by said probe in response to pivotal movement of the outer door, said probe being positioned so as to extend past said deflectable sealing element and through said opening into the interior of said freezing compartment when the outer door is in the closed position; and

said cooling portion being connected to the door and extending along an inner wall of the door.

4,015,443
KNITTED FABRICS HAVING PATTERN EFFECTS

Vinicio Luchi, Via Wilfredo Pareto 43, Prato, Florence, Italy

Filed Apr. 4, 1975, Ser. No. 565,258
Claims priority, application Italy, Apr. 19, 1974, 9412/74
Int. Cl.² D04B 9/12
U.S. Cl. 66—9 R 5 Claims



1. A process for forming a fabric using a knitting machine having needles, said process comprising knitting on the machine a fabric having courses of interlinked stitches, incorporating longitudinal and first transverse weft yarns in the fabric, incorporating a further transverse weft yarn in the fabric, said further transverse weft yarn being interlinked with the zones of the fabric in which the stitches of one course of knitted

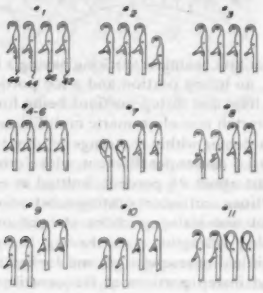
stitches are interlinked with those of an adjacent course, and providing a needle selection such that the further weft yarn appears in selected parts of the surface of the fabric.

4,015,444

METHOD OF KNITTING A TWO-WAY NON-RUN VENTILATED FABRIC

Daniel W. Johnson, Cleveland, Tenn., assignor to Amtex, Inc., Cleveland, Tenn.

Filed Feb. 6, 1976, Ser. No. 655,934
Int. Cl.² D04B *9/38*
U.S. Cl. 66—42 **6 Claims**



1. A method of knitting a ventilated fabric which is non-run in a longitudinal direction and in a transverse direction comprising the steps of:

a. knitting said fabric in the form of a cylinder on a circular knitting machine wherein the number of thread feeds is a whole number multiple of nine operative at three different speeds, and the number of knitting positions being a whole number multiple of 11 so as to have two terminal knitting positions which lack a thread feed, said knitting step including rotating a needle carrier cylinder about a vertical axis, providing the needle carrier cylinder with needles arranged in a repetitive set of four needles,

b. camming the needles into knit, welt and tuck positions as they rotate about said axis,

c. using the intermediate thread speed to build up excess thread on the last two needles of each set of four needles when they are in a knit position and the other two needles of that set when they are in a welt position to provide extra fabric strength, and subsequently casting off the thread from the two needles on which excess yarn was built up to create a drop stitch.

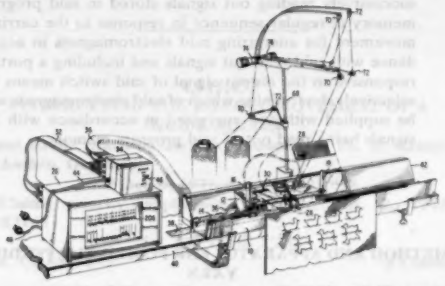
4,015,445

AUTOMATED HOME KNITTING MACHINE WITH MEANS FOR CONTROLLING THE KNITTING OF DESIGN ROWS

William Kahan, New York, N.Y., and Thomas Richard Peer, Glenwood, N.J., assignors to The Singer Company, New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,178
Int. Cl.² D04B *15/66*
U.S. Cl. 66—75.2 **12 Claims**

1. In a programmable knitting machine the combination comprising a needle bed wherein needles are supported in side by side relation, needle selecting means including a carriage movable on the needle bed for causing the needles during each movement thereof in one direction or another to knit a course of fabric, a program card and a card reader for reading rows of instruction marks on the card for a design to be formed in a fabric in courses corresponding to said rows, electronic control means responsive to the reader and operably connected to the needle selecting means for controlling the knitting of fabric pursuant to the instruction marks, switch means operably connect to the electronic means, the switch means being manually operable to modify the operation of the



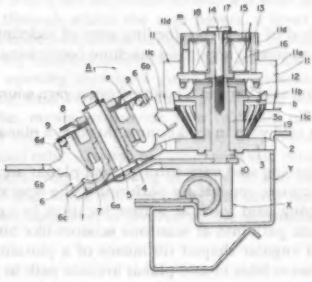
electronic control means and thereby control the order in which design rows are knit into courses on the machine, and a device responsive to the operation of the switch means for visually indicating a knitting order as prescribed by the switch means for the design rows.

4,015,446

PATTERNING SYSTEM FOR A KNITTING MACHINE

Yutaka Kagaya, Musashi-Murayama, Japan, assignor to Silver Seiko Co., Ltd., Kodaira, Japan

Filed Sept. 12, 1975, Ser. No. 612,861
Claims priority, application Japan, Sept. 14, 1974, 49-105522
Int. Cl.² D04B *7/00, 15/66*
U.S. Cl. 66—75.2 **12 Claims**



1. A patterning system in a hand-operated straight knitting machine comprising, in combination:

a needle bed;

movable knitting needles mounted in said needle bed and each having a butt;

a carriage mounted for reciprocative sliding movement along said needle bed;

a pair of needle selecting means mounted on said carriage in a spaced relation from each other in the longitudinal direction of said needle bed for engagement with said butts of said needles to select the latter, each of said needle selecting means including an electromagnet;

program providing means for providing a unit number of electric signals representative of data for needle selection for a course of knitting;

switch means for detecting the moving direction of said carriage relative to said needle bed and providing an electric signal representative of the moving direction of said carriage; and

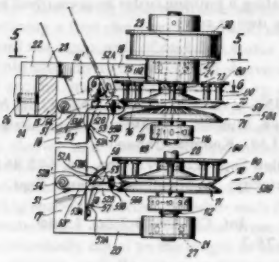
control circuit means for control of said electromagnets

including a program memory electrically connected with said program providing means for temporarily storing therein signals provided by said program providing means, said program memory being controlled by and connected to said switch means, and read out means for successively reading out signals stored in said program memory in regular sequence in response to the carriage movement for energizing said electromagnets in accordance with said read out signals and including a portion responsive to the output signal of said switch means for selectively determining which of said electromagnets is to be supplied with and energized in accordance with the signals being read out of said program memory.

4,015,447
METHOD AND APPARATUS FOR POSITIVELY FEEDING YARN

Morris Philip, 2519 Grand Ave., Bronx, N.Y. 10468

Filed Jan. 3, 1975, Ser. No. 538,268
Int. Cl.² D04B *15/48*
U.S. Cl. 66—132 R **21 Claims**



1. A method of positively feeding yarn of indefinite length from a yarn source to a knitting machine comprising the steps of:

a. extending said yarn in a course from a yarn source to said machine;

b. feeding said yarn in said course through a planar arcuate path;

c. while feeding said yarn through said planar arcuate path in said course repeatedly performing the operations of

1. wedging said yarn at a first location in said planar arcuate path into at least one scissors-like bite formed by an angular shaped rib means of a plurality of such rib means bites in said planar arcuate path to positively grip and hold said yarn from slippage relative to said rib means bite and said yarn course;

2. while gripping and holding said yarn from slippage relative to said bite and said yarn course moving said bites with said yarn grip thereby downstream along said planar arcuate path to draw said yarn from said source and to convey said yarn downstream through a portion of said course, and

3. releasing said yarn from said rib means bites at a location in said planar arcuate path downstream from said first location while wedging said yarn in said planar arcuate path upstream of said release location and at said first location into at least another one of said plurality of scisso.-like bits formed by an angular shaped rib means;

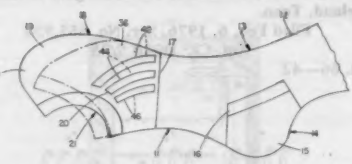
c. said repeated operations overlapping so that said yarn is being continuously gripped, held and conveyed by at least one rib means bite to continuously maintain the movement of the yarn under the control of said bites, whereby said yarn is positively fed by said moving bites;

d. said bites, during said movement, being moved synchronously with the knitting operation of said machine.

4,015,448
SUPPORT STOCKING

Herbert Knohl, Seneca, S.C., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 426,318, Dec. 19, 1973, abandoned. This application Jan. 8, 1975, Ser. No. 539,350
Int. Cl.² D04B *9/52, 9/56*
U.S. Cl. 66—185 **7 Claims**



1. A tubular knit seamless stocking having a boot portion, a heel portion, an instep portion and a toe portion

said boot, heel and instep portions being formed primarily of fine stretch non-elastomeric multifilament torque yarn having a denier within the range of about 50 to 100 and of 2.5 to 5.5 denier per filament, with a crimp contraction of at least about 46 percent, knitted in every course of said portions and incorporating substantially throughout said boot and instep portions at least one elastomeric stretchable retractive yarn having the major portion thereof inlaid coursewise of, and locked in, said knitted boot and instep portions at frequent intervals in every course in which it occurs

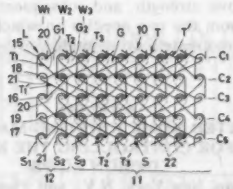
said toe portion being formed primarily of said non-elastomeric yarn free from elastomeric stretchable retractive yarn and

said heel and toe portions each including a shaped pocket knit of said non-elastomeric yarn including partial courses, the yarn of each partial course being cut at opposite ends, and the yarn of each partial course being knit in tuck-float relationship at its terminal ends with at least one stitch loop of an immediately adjacent course to prevent pulling out of the cut ends of yarn.

4,015,449
SLIDE FASTENER TAPE

Yoshio Matsuda, Nyuzen, and Akira Nogai, Kurobe, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Apr. 17, 1975, Ser. No. 569,097
Claims priority, application Japan, Apr. 25, 1974, 49-46902
Int. Cl.² D04B *21/00*; A44B *19/00*
U.S. Cl. 66—195 **2 Claims**



1. A stringer tape of a warp-knitted structure for mounting thereon a row of interlocking fastener elements, comprising a web portion and a marginal edge portion to which the row of interlocking fastener elements is secured by a line of sewing stitches, said marginal edge portion including an outermost wale extending outwardly of said line of stitches and tricot stitches connecting each course of said outermost wale to a corresponding course in an adjoining wale, and said line of stitches passing through sinker loops of said tricot stitches interconnecting said outermost wale and adjoining wale said tricot stitches being the sole connection between said outermost and adjoining wales.

4,015,450
CONCEALED SLIDE FASTENERS

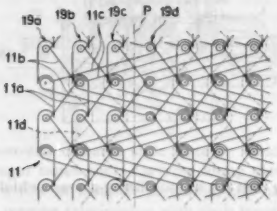
Yoshio Matsuda, Nyuzen, and Yoshitoki Tsubokawa, Kurobe, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Sept. 10, 1975, Ser. No. 611,896

Claims priority, application Japan, Sept. 25, 1974, 49-116206[U]

Int. Cl.² D04B *21/00*

U.S. Cl. 66—195 **2 Claims**



1. In a concealed type of slide fastener having a pair of warp-knit support tapes each having a longitudinal element-carrying edge portion inwardly folded toward the remaining portion of the tape, rows of fastener elements, each row secured to a respective element-carrying edge portion; each of said fastener elements having leg portions, a coupling head portion merging into said leg portions and connecting portions remote from said coupling head portion and connecting the element to respective adjacent elements, said support tapes having knitted threads forming a warp-knit structure defining on one surface of each support tape a multiplicity of longitudinally extending alternated wales and interwale grooves, the improvement in which the number of knitting threads forming the wales is reduced at the wale region of each support tape which is located adjacent the path of a sewing needle as compared to the number of knitting threads at the remaining regions of the tape, whereby each support tape can be sewn onto a garment fabric in a manner that the sewing needle provides a sewn seam at and along the inwardly folded edge of the tape, the wale region adjacent the path of said sewing needle consisting of tricot stitches in the lay 1-2/1-0 and stitches in the lay 0-1/4-3 while the remaining regions of the support tape consist of chain stitches, tricot stitches in the lay 1-2/1-0 stitches in the lay 0-1/4-3 and reinforcing warp threads.

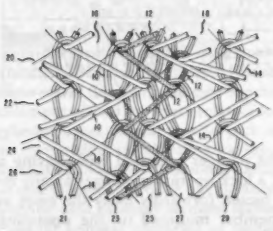
4,015,451
WARP KNIT FABRIC

Bharat Jaybhadra Gajjar, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 8, 1975, Ser. No. 620,836

Int. Cl.² D04B *21/00*

U.S. Cl. 66—195 **13 Claims**



1. A warp knitted fabric at least a portion of which comprising: at least two full sets of threads knitted in courses according to a stitch pattern forming spaced wales of knitted loops, said portion of said fabric having a continuous pattern throughout its length of at least one group of wales, said group of wales, said group being separated from adjacent wales by exaggerated spacing.

4,015,452
INTERRUPTING THE ROTARY MOVEMENT OF A GUIDE ROLLER

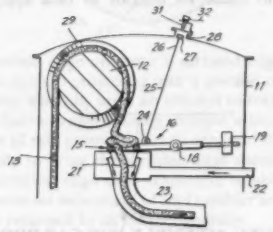
Hans Kreitz, Aachen, Germany, assignor to Fa. H. Krantz, Aachen, Germany

Filed Oct. 9, 1975, Ser. No. 621,058

Claims priority, application Germany, Nov. 2, 1974, 2452185

Int. Cl.² D06B *3/28*

U.S. Cl. 68—175 **5 Claims**



1. Apparatus for automatically interrupting the movement of a textile web in a processing tank when said web accumulates in said tank, comprising a roller, drive means for said roller, said web passing over said roller for advance thereof, a frame on which the accumulated web will bear and having an opening through which the web passes, a lever pivoted between its ends, said frame being supported by one end of said lever, a ring nozzle positioned beneath said frame and aligned with the opening therein, a guide tube associated with said ring nozzle, said web passing through said ring nozzle and said guide tube, means to provide flow of liquid under pressure into said ring nozzle and said tube to advance said web through said tube, a switch in circuit with said drive means and means operatively connecting said lever to said switch to open the latter and break the circuit to the drive means for said roller when said lever is pivoted by the accumulation of web thereon.

4,015,453
DYE PAN MOUNTING FOR APPARATUS FOR MULTI-COLOR DYEING OF YARN ENDS

Clifford Aldene Bryant, Dalton, Ga., assignor to West Point Pepperell, Inc., West Point, Ga.

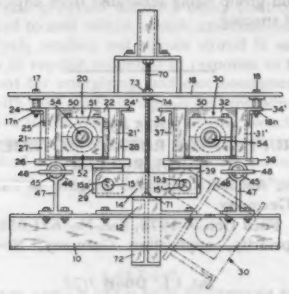
Filed Feb. 26, 1976, Ser. No. 661,569

Int. Cl.² D06B *1/14, 23/30*

U.S. Cl. 68—202 **11 Claims**

1. In a machine for selective dyeing of yarns in a sheet thereof wherein the yarn sheet passes over dye-pick-up rolls, a receptacle having greater length than width and adapted to hold dye, fixed supporting framework, securing means adjacent an edge of said receptacle supporting said receptacle from said framework in dye-holding position, a dye-pick-up roll positioned within said receptacle and adapted to be engaged by passing yarns, pivot means supporting said receptacle and having an axis running lengthwise of said receptacle and being supported from said framework, the axis of said pivot means being parallel in a lengthwise direction to said

receptacle and positioned adjacent one wall of said receptacle to enable tilting of said receptacle when freed from said supporting means to cause its interior to face approximately vertically.

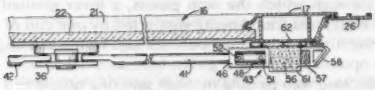


4,015,454

LATCHING ASSEMBLY FOR CAP DOOR

Dale L. Struble, Reading Township, Hillsdale County, Mich., assignor to Union Products, Incorporated, Sturgis, Mich.

Filed Mar. 29, 1976, Ser. No. 671,266
Int. Cl.² E05C *1/12, 21/00*
U.S. Cl. 70—2 **10 Claims**



1. In a cap door having a pair of spaced and substantially parallel frame elements, one of said frame elements being adapted to be hingedly connected to a cap, a handle rotatably supported on the other frame element and disposed adjacent the exterior side of the door, and a latching mechanism mounted on the door and positioned adjacent the interior side of said other framing member, said latching mechanism being interconnected to and activated by said rotatable handle, the improvement wherein said latching mechanism includes.

a rotatable lever drivingly interconnected to and rotated by said handle;

an elongated rigid rod extending along one side of said door and having one end thereof pivotally connected to said lever;

guide means fixed to said door and coacting with said rod adjacent the other end thereof for slidably guiding same; and

bolt means mounted on the other end of said rod and being positioned to project outwardly beyond an edge of the door so as to latchingly engage a part of the cap, said bolt means including a bolt member slidably mounted on the other end of said rod and spring means coacting between said bolt member and said rod for normally urging said bolt member axially outwardly of said rod;

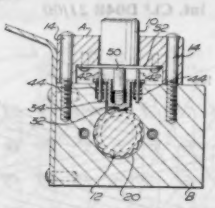
said bolt means further including conversion means associated with at least one of said rod and bolt member for permitting said bolt member to be rigidly fixed relative to said rod when it is desired to have said latching mechanism function as a deadbolt.

4,015,455

LOCKING UNIT FOR IMMOBILIZING VEHICLES

Peter Leverton, South Kirkby, near Pontefract, England, assignor to Nu-Line Products (Engineering) Limited, United Kingdom

Filed Aug. 27, 1975, Ser. No. 608,025
Int. Cl.² E05B *17/00*
U.S. Cl. 70—19 **3 Claims**



1. A locking unit for immobilizing a road vehicle, comprising

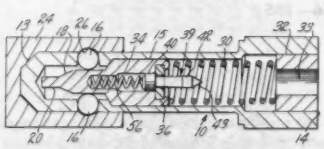
1. a sealed housing adapted to be affixed to the vehicle,
2. a locking member operatively connected to the sealed housing by a shaft arranged to rotate in the housing, the shaft carrying ratchet teeth within the housing, at least one end of the shaft being accessible from outside the housing and having a coupling arm attached thereto whereby the coupling arm can be connected to an appropriate part of the vehicle,
3. a pawl mounted in the housing for engagement with the ratchet teeth on the locking member,
4. guide means in the housing for guiding the pawl into engagement with the ratchet teeth,
5. first resilient means in the housing urging the pawl out of engagement with the locking member,
6. a lock affixed to the housing, the lock having a barrel arranged to move in and out relative to the ratchet teeth of the locking member, one end of the barrel being adapted to actuate the pawl, the lock being released by a key to permit movement of the barrel, and
7. second resilient means disposed between the pawl and said one end of the barrel whereby inward movement of the barrel causes the pawl to engage the ratchet teeth and prevent rotation of the locking member in one direction while permitting rotation in the opposite direction.

4,015,456

PLUNGER-OPERATED LOCK

Sigurd M. Moberg, Etlan, Va., assignor to E. J. Brooks Company, Newark, N.J.

Filed June 28, 1976, Ser. No. 700,078
Int. Cl.² E05B *67/36*
U.S. Cl. 70—34 **5 Claims**

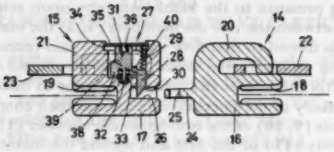


1. A lock of the plunger operated type, having a housing open at one end, a lock operating plunger axially movable in the housing and biased forwardly away the open end and a tool-engagable member mounted on the operating plunger said member being spring biased to normally extend rearwardly therefrom and being movable forwardly into an inaccessible position on the application of a forward axial force thereto.

4,015,457
INTERLOCKABLE SLIDERS

Takeo Fukuroi, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Feb. 6, 1976, Ser. No. 655,962
Claims priority, application Japan, Feb. 10, 1975, 50-18774[U]
Int. Cl.² A44B *19/26*; E05B *67/38*
U.S. Cl. 70—68 **4 Claims**



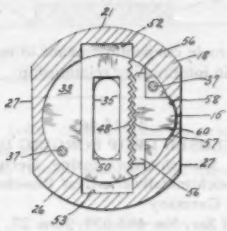
1. In a two-way closable slide fastener which comprises a pair of stringer tapes each carrying along their longitudinal inner edge a row of fastener elements, and a pair of sliders disposed in reverse relationship with their front ends opposed to each other, and movable along the rows of fastener elements so that the slide fastener may be closed by the sliders from either end thereof, each of the sliders having a pair of spaced apart upper and lower portions and a connecting portion interconnecting the upper and lower portions at the front end of the slider to define a guide channel for guiding the rows of fastener elements therethrough, and one of the sliders having a chamber formed in the upper portion thereof, the improvement which comprises in combination: a tongue formed on the connecting portion of the other slider and extending toward the front end of the one slider having said chamber, said tongue having an aperture formed therein; means defining in the connecting portion of said one slider a socket portion for receiving said tongue therein; and a locking means for locking the sliders together, said locking means being contained in said chamber of the upper portion of said one slider and including a generally cylindrical rotating member supported within said chamber for rotation relative thereto, a bolt member, and a biasing means for normally urging said bolt member into said socket portion, said bolt member having a surface cooperating with said biasing means to permit the bolt member to engage said aperture upon insertion of said tongue into said socket portion, and biasing means operatively engaging said bolt member with said cylindrical member to selectively disengage the bolt member from said aperture in response to the rotary movement of said cylindrical member when said tongue is received in said socket portion.

4,015,458
WAFER TYPE TUMBLER LOCK CONSTRUCTION HAVING INDIVIDUAL SIDE BAR TUMBLER INHIBITING MEANS

Leonard Mercurio, 34 Beaumont Drive, Plainview, N.Y. 11803

Filed Nov. 21, 1975, Ser. No. 634,156
Int. Cl.² E05B *15/14*
U.S. Cl. 70—364 R **2 Claims**

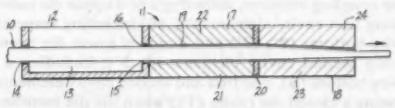
1. In a cylinder type lock including a housing and a cylinder element rotatably disposed within said housing, said cylinder having planar wafer tumblers and side bar means for inhibiting lateral movement of said tumblers relative to the principal axis of said cylinder upon an attempt to pick said lock, the improvement comprising: said housing having a cylindrical bore supporting said cylinder for rotational motion, said bore having at least one elongated groove having an axis parallel to that of said cylinder; said cylinder element including a plurality of generally planar annular segments in mutually stacked relation, elongated pin means penetrating each of said segments for integrating said cylinder elements; each of said segments including a diametrically extending first slot therein, and a second slot radially extending substantially at right angles to and communicating with said second slot; one of said wafer tumblers being disposed in said first slot, each tumbler having a generally centrally disposed key-engaging through opening, and first and second longitudinal edges, at least one of which is serrated; a T-shaped side bar member having an elongated shank portion slideably disposed in said second slot of each of said segments, and a cross bar portion having a serrated edge thereon disposed in said first slot to position said last mentioned serrated edge opposite a serrated edge of a tumbler, said shank portion projecting into a portion of said groove in said housing; whereby upon an attempt to rotate said cylinder element relative to said housing element without a proper key, the surface of said groove serves to cam said shank of said side bar inwardly to bring the serrated edge thereon into contact with the serrated edge on a respective tumbler element and inhibit transverse movement of said tumbler until said cylinder element is returned to its initial condition.



4,015,459
HYDRODYNAMIC DRAWING OF MULTIPLE GAUGE METAL STRIP

Joseph Winter, New Haven; Eugene Shapiro, Hamden, and Warren F. Smith, Branford, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 462,755, April 22, 1974, abandoned. This application Dec. 31, 1975, Ser. No. 645,749
Int. Cl.² B21C *3/10*
U.S. Cl. 72—45 **24 Claims**



1. A method for the preparation of multiple gauge metal strip of rectangular cross section possessing regions of at least two variable thicknesses defining a stepped surface configuration in at least one of the broad surfaces of said strip said method comprising, drawing a previously shaped strip through a die defining said rectangular cross section wherein direct surface-to-surface contact between said strip and said die is prevented, the width dimension of said strip is unchanged and the ratio of strip perimeter to strip cross sectional area changes by at least 30%.

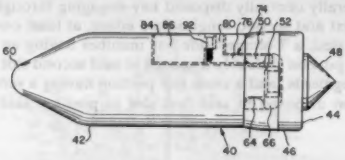
4,015,460
ROLLING MILL PLUG ASSEMBLY

Harry M. Moore, Jr., Beaver Falls, Pa., assignor to Damascus Steel Casting Company, New Brighton, Pa.

Filed Jan. 9, 1976, Ser. No. 647,908
Int. Cl.² B21B *25/00*
U.S. Cl. 72—97 **8 Claims**

1. A rolling mull plug assembly comprising a guide plug and a working plug, said working plug including female connecting means and said guide plug including male connecting means

for interlocking relationship with said female connecting means, said assembly including locking means associated with



the male and female connecting means to maintain said connecting means in interlocking relationship.

4,015,461

CLOSED DROP FORGING DIE

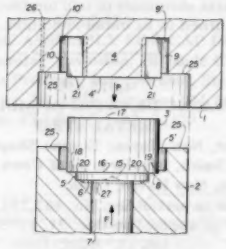
Franz Schober, Munich-Obermenzing, Germany, assignor to Bayerische Leichtmetallwerk Graf Bluecher von Wahlstatt KG, Munich, Germany

Continuation of Ser. No. 483,631, June 27, 1974, which is a continuation-in-part of Ser. No. 301,873, Oct. 30, 1972. This application Nov. 20, 1975, Ser. No. 633,822

Claims priority, application France, July 27, 1972, 72.27067

Int. Cl.² B21J *1/06, 5/00*

U.S. Cl. 72—358 **4 Claims**



1. A closed hot drop-forging die for shaping a blank into a claw coupling member, including a first upper die member (**1**) having first cavity elements (**9, 10**) including respective first cavity bottoms (**9', 10'**) and a second lower die member (**2**) having second cavity elements (**5, 5'**), including a second cavity bottom (**6**), said first and second cavity elements (**5, 5'**) forming a closed die cavity (**11**) when the die members are in interface contact with each other, the volume of the die cavity in the closed condition of the die members corresponding to the volume of said blank, the die members having interface surfaces which completely contact each other in the closed condition of said die members to avoid a flash gutter at said interface surfaces, and wherein one of the die members is movable relative to the other along a central, longitudinal axis common to both die members, wherein the first upper die member (**1**) comprises a first facing surface (**4'**) having a central portion and sectional portions extending radially outwardly from said central portion, said first facing surface being located symmetrically and centrally relative to said longitudinal axis and adapted to initially engage one facing surface (**17**) of the blank to apply the forging pressure to the blank, said first facing surface (**4'**) being located axially and radially remote from the first cavity bottoms (**9', 10'**) of the first cavity elements (**9, 10**), said first facing surface (**4'**) having a given surface area, and wherein the second, lower die member (**2**) comprises a second, substantially ring shaped facing surface (**8**) constituting a counter support adapted to initially support a corresponding ring surface (**18**) of the blank opposite said one facing surface (**17**) of the blank, said second facing surface (**8**) being located axially remote from the second bottom (**6**) of the second cavity elements (**5'**) of the second lower die member (**2**), wherein the second cavity elements include a recess (**5**) below said ring shaped facing surface (**8**) and an annular cavity element (**5'**) above said ring shaped surface (**8**), and a cylindrical wall portion (**19**) between said surface (**8**) and said second cavity element (**5'**) to center the blank and close the lower cavity when the blank rests on said surface (**8**), said second ring shaped facing surface (**8**) having a surface area substantially less than said given surface area of said first facing surface (**4'**) which applies the forging pressure to the blank, whereby upon relative movement between the two die members (**1, 2**) the material of the blank is forced to first flow axially into said recess (**5**) below said ring shaped facing surface (**8**) of the second die member (**2**) to fill this recess (**5**) completely prior to being forced to flow axially in the opposite direction to then enter the cavity elements (**9, 10**) of the first upper die member (**1**) whereafter the cavity (**11**) of the first and second die members is completely filled, said die further comprising venting means.

4,015,462

DEVICE AND METHOD FOR THE DETERMINATION OF THE SPECIFIC GRAVITY OR OSMOLALITY OF A LIQUID

Jerome Greyson, and Sisto Nicholas Stiso, both of Elkhart, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed Jan. 8, 1976, Ser. No. 647,416

Int. Cl.² G01N *9/00, 13/04*

U.S. Cl. 73—32 R **7 Claims**

7. Test means for determination of specific gravity or osmolality of a liquid, comprising a plurality of osmotically fragile, semipermeable membrane capsules each enclosing an inner phase of predetermined specific gravity containing a solute and a coloring substance, contact of said test means with a liquid having a specific gravity lower than said predetermined specific gravity producing hydrostatic pressure within said capsules which is effective to cause release of said inner phase from said capsules, the density of the color produced by release of the coloring substance from said capsules upon such contact being inversely related to and indicative of the specific gravity of the liquid contacted.

4,015,463

MEASURING DEVICE FOR THE WATER ACTIVITY OF FREE WATER CONTAINING VICTUALS

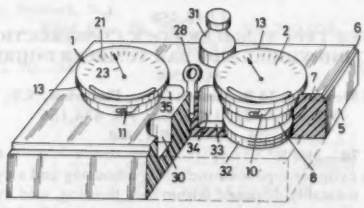
Otto Friedrich Pott, Mossingen, Germany, assignor to G. Lufft Metallbarometerfabrik, Stuttgart, Germany

Filed June 30, 1975, Ser. No. 592,062

Claims priority, application Germany, June 28, 1974, 2431051

Int. Cl.² G01N *33/00*

U.S. Cl. 73—73 **13 Claims**



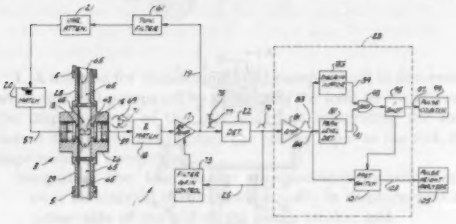
1. A readily portable measuring apparatus for measuring the water activity of substances containing free water, including a foamed lower section of insulating material, a foamed upper section of insulating material connected to said lower section, a closed receptacle formed of separable top and bottom parts, said bottom part receiving the substance to be measured, the top part carrying hygrometer means and thermometer means therein, the bottom part of said receptacle frictionally engaging in a recess in said lower section, said top and bottom parts

being separably connected with sealing means therebetween to form the closed receptacle, said top part opening to said bottom part, said top part projecting above said lower section, said upper section being recessed to surround and extend above said top part, the instruments in said top part being readable from above said receptacle and said upper section having an opening through which said instruments may be observed.

4,015,464
ULTRASONIC CONTINUOUS WAVE PARTICLE MONITOR

James G. Miller, Clayton; Richard E. Clark, Richmond Heights; Mark S. Conradi; Dennis R. Dietz, both of Clayton, all of Mo., and Joseph S. Heyman, Gloucester, Va., assignors to The Washington University, St. Louis, Mo.

Filed Feb. 21, 1975, Ser. No. 551,913
Int. Cl.² G01N *29/02*, *15/00*
U.S. Cl. 73—61 R **18 Claims**



1. Apparatus for sensing particles in a fluid medium comprising:

an ultrasonic resonator cavity for containing a fluid medium;

first transducer means on one side of the cavity for continuously propagating thereacross ultrasonic compressional waves whose phase and amplitude are perturbed by the presence of particles in the fluid medium;

second transducer means positioned on the opposite side of the cavity from the first transducer means substantially parallel to and in registry therewith for receiving the ultrasonic waves and converting them to rf electric waves of the same frequency and whose phases and amplitudes are modulated in response to any perturbations in the ultrasonic waves;

means for amplifying the rf waves;

feedback means for applying the amplified rf waves to the first transducer means thereby to establish a self-excited continuous wave oscillatory circuit;

attenuation means in the circuit for causing its operation to be marginally oscillatory whereby small changes in the amplitude of the rf waves caused by any perturbations in the ultrasonic waves produce relatively large changes in the amplitude thereof; and

detection means responsive to perturbations in the rf wave for demodulating the amplified rf wave to produce signals indicative of the presence of particles in the fluid medium whereby enhanced sensitivity to small changes in the ultrasonic properties of the fluid medium caused by the presence of particles therein is achieved.

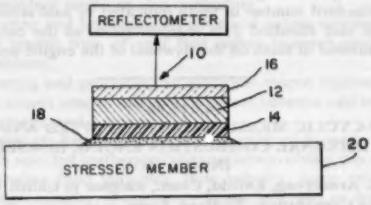
4,015,465
COLOR DISPLAYING FATIGUE SENSOR

William R. Scott, 532 Harbour Drive, Andalusia, Pa. 19020

Filed Mar. 31, 1975, Ser. No. 563,916
Int. Cl.² G01N *3/00*; G01B *11/18*
U.S. Cl. 73—91 **5 Claims**

1. A fatigue analysis process for determining the amount of fatigue experienced by a structural member subject to cyclic loading comprising:

affixing a continuous metal alloy film to a portion of a surface of said specimen, said film being selected from the group consisting of $Ag_{50}Zn_{50}$, CuAu, Cu_3Au, $Ag_{54}Zn_{46}$ and $Ag_{50}Cd_{50}$, and having the property of undergoing a



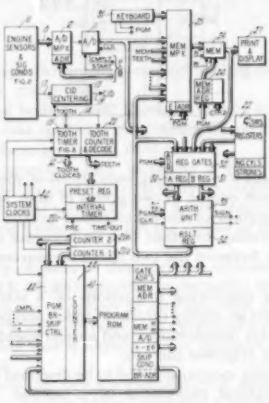
detectable color change upon experiencing sufficient cyclic stress; and

observing said film to ascertain the extent of said color change.

4,015,466
DETERMINATION OF NUMBER OF TEETH ON AN INTERNAL COMBUSTION ENGINE FLYWHEEL

Philip P. Stick, Enfield; James F. Willenbecher, East Windsor, and Lee R. Armstrong, Enfield, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 7, 1976, Ser. No. 684,037
Int. Cl.² G01N *15/00*
U.S. Cl. 73—116 **9 Claims**



1. Apparatus for determining the number of teeth on the flywheel of an internal combustion engine, comprising:

tooth sensing means adapted to be disposed to sense the passage of each tooth of the flywheel of the engine when the engine is rotating, said means providing a tooth signal each time that an integral number of teeth of the flywheel passes in proximity to said tooth sensing means;

means for registering a plurality of standard data manifestations, each one representing a number indicative of a number of teeth permissible on a flywheel of an internal combustion engine of the type under test;

processing means, responsive to the tooth signals presented by said tooth sensing means and to said registering means, for measuring the number of said tooth signals provided as the engine rotates through a known angle and presenting a measured data manifestation indicative of the number of teeth on said flywheel, for comparing said mea-

sured data manifestation with each of said standard data manifestations and for selecting one of said standard data manifestations of said registering means as a result of the comparison; and

means presenting for system use a manifestation of the standard number of teeth indicated by said selected one of said standard data manifestations as the determined number of teeth on the flywheel of the engine under test.

4,015,467

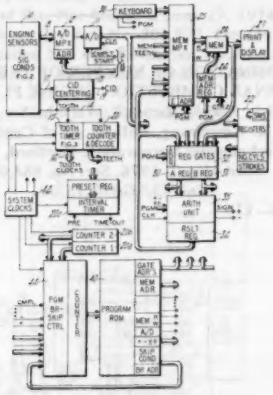
SUB-CYCLIC MEASUREMENTS OF SPEED AND TIME FOR INTERNAL COMBUSTION ENGINE HORSEPOWER INDICATION

Lee R. Armstrong, Enfield, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed May 7, 1976, Ser. No. 684,217

Int. Cl.² G01L 5/26

U.S. Cl. 73—116 4 Claims



1. Apparatus for providing indications of speed of an internal combustion engine at two points in time, spaced across a significant portion of an acceleration profile of the engine while accelerating, together with an accurate measure of the elapsed time between the two speed measurements, comprising:

means for registering indications of a starting threshold speed and an ending threshold speed and providing a start speed data manifestation and an end speed data manifestation in response thereto;

speed sensing means, adapted to be disposed for response to a mechanical movement of a portion of the engine through successive angles which are a small fraction of a full revolution of the engine, for successively providing measured data manifestations of the time elapsed during angular revolution of the engine through said known angle;

an interval timer operative in response to command input signals applied thereto to commence timing of an interval and to cease timing of an interval and to provide an elapsed time manifestation indicative of the interval of time measured thereby; and

processing means responsive to said speed sensing means and to said registering means for comparing said measured data manifestation against said start manifestation and said end data manifestation and for providing a start command input signal to said interval timer in response to said measured data manifestations indicating a speed as high as the speed represented by said start data manifestation, and responsive to said measured data manifestation indicating that the engine has achieved a speed equal to said end speed manifestation to provide a stop command input signal to said interval timer.

4,015,468

DEVICE FOR THE MEASUREMENT OF THE RADIAL FORCE SUSTAINED BY A ROTARY ORGAN

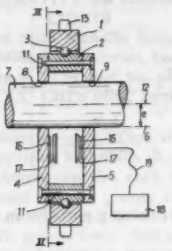
François Simon, Chemin des Molieres, Le Viviers Du Lac, France 73420

Filed July 3, 1975, Ser. No. 592,892

Claims priority, application France, July 12, 1974, 74.24304

Int. Cl.² G01L 5/00

U.S. Cl. 73—136 R 10 Claims

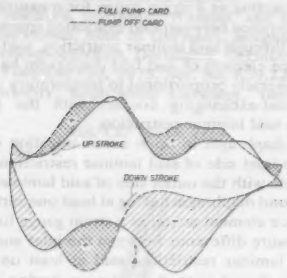


1. A device for the measurement of the relative radial force between a rotatable organ and a stationary support, comprising an outer annular organ to which a force is applied, the radial component of which is to be measured; an inner annular organ mounted concentrically within said outer annular organ; means for rotatably mounting said outer annular organ on said inner annular organ so that said outer annular organ rotates about a first common axis of said inner and outer annular organs in response to said force; a first end support flange mounted to one side surface of said inner annular organ; a second end support flange mounted to the other side surface of said inner annular organ and parallel with said first end support flange; means passing through said inner annular organ having a first end connected to said first end support flange and a second end connected to said second end support flange for mounting said end support flanges to said side surfaces of said inner annular organ; each of said inner annular organ, said first end support flange, and said second end support flange having an opening formed therethrough, the opening in said inner annular organ being greater than the openings in said first and second end support flanges and the opening in each of said inner annular organ and said first and second support flanges being in axial alignment; stationary support means for supporting said inner and outer annular organs and said end support flanges extending through each of said openings; and means mounted on at least one of said end support flanges and said inner annular organ for detecting deformation caused by said force, said openings in said first and second end support flanges, and said inner annular organ, said stationary support means for supporting said inner and outer annular organs and said first and second support flanges having a second common axis offset from said first common axis in a radial direction so that said first common axis, said second common axis, and said radial component of said force all lie in a common vertical plane, whereby in response to said force one of said end support flanges and said inner annular organ is deformed in response to the radial component thereof and is measured by said means for detecting.

4,015,469
PUMP-OFF MONITOR FOR ROD PUMP WELLS

Fred A. Womack, Humble, and Daniel F. Jahns, Houston, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed July 2, 1976, Ser. No. 701,774
Int. Cl.² E21B 47/00
U.S. Cl. 73—151 2 Claims



1. A method for monitoring a rod pumped well to determine when the well pumps-off by measuring the load on the rod and the displacement of the rod and then integrating the load versus displacement to obtain the energy input to the rod, the improvement comprising:

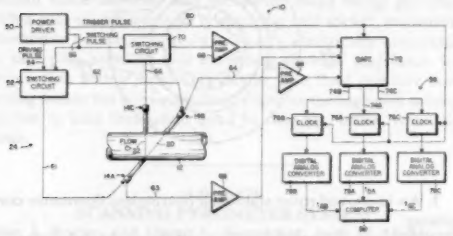
integrating the load versus displacement measurements over an interval that extends equally in displacement on either side of the top of the pump stroke; and

determining when the well pumps-off by comparing the integrated values to detect when the integrated value decreases.

4,015,470
FLOW MEASURING METHOD AND APPARATUS

Roderick G. Morrison, Idaho Falls, Idaho, assignor to TRW Inc., Redondo Beach, Calif.

Filed Dec. 26, 1973, Ser. No. 428,270
Int. Cl. G01f 1/00
U.S. Cl. 73—194 A 10 Claims



1. The method of measuring selected variables of a fluid flowing through a conduit comprising the steps of:

transmitting first acoustic pulses through said fluid between first pulse transmitting and receiving positions located at opposite sides of the conduit passage and along a first path crossing said passage normal to and intersecting the conduit axis in a manner such that the pulse transit times between said positions and the adjacent points of intersection of said path with the passage wall are in a known ratio;

transmitting second acoustic pulses through said fluid between second pulse transmitting and receiving positions located at opposite sides of the conduit passage and along a second path crossing said passage at an oblique angle to and intersecting the conduit axis in a manner such that the pulse transit times between said second positions and the adjacent points of intersection of said second path with said passage wall are in a known ratio;

one of said first positions and one of said second positions coinciding and the path intersection points adjacent said coincident positions also coinciding;

measuring and producing an electrical output representing the transit time of said first pulses between said first positions;

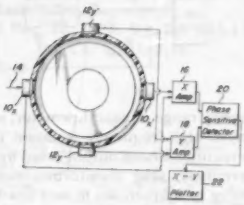
measuring and producing an electrical output representing the transit time of said second pulses between said second positions; and

said outputs being adapted to be combined in accordance with selected mathematical equations to obtain any of the following fluid variables: flow velocity, sonic velocity, compressibility, temperature, mass flow rate, or density.

4,015,471
SPHERICAL ELECTROMAGNETIC WATER CURRENT VELOCITY SENSOR WITH PROTRUDING ELECTRODES

Lawrence B. Marsh, Silver Spring, Md., assignor to Marsh-McBirney, Inc., Rockville, Md.

Filed Nov. 18, 1975, Ser. No. 633,000
Int. Cl.² G01F 1/58
U.S. Cl. 73—194 EM 5 Claims



1. Electromagnetic sensing means for sensing the velocity of a fluid current, comprising

a. a spherical body (2, 30) formed of a non-ferromagnetic material, said spherical body being adapted to be completely submerged in the fluid current;

b. electromagnetic means including a first coil (4, 34) mounted within said spherical body for establishing in the fluid about said spherical body a first magnetic field the axis of which passes through the center of said spherical body;

c. a plurality of pairs of diametrically-opposed electrodes (10, 12; 42, 44, 46) mounted in circumferentially spaced relation on the periphery of said spherical body,

1. each of said electrodes being contained in a common first plane that is normal to the magnetic axis of said first coil,

2. the electrodes of each electrode pair protruding from the outer surface of said spherical body by a common distance which is between 0.100 and 0.125 inch per inch of diameter of said spherical body; and

d. detecting and indicating means (16, 18, 20, 22; 54, 56, 52, 60) for comparing the amplitudes of the electrical signals produced across the electrodes of the electrode pairs, respectively, thereby to afford an indication of the velocity of the fluid current.

4,015,472
TWO-WIRE TRANSMISSION SYSTEM FOR VORTEX FLOWMETER

Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

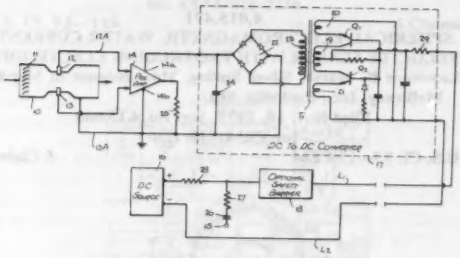
Filed Mar. 9, 1976, Ser. No. 665,178
Int. Cl.² G01F 1/32
U.S. Cl. 73—194 B 10 Claims

1. An isolated two-wire line transmission system for supplying d-c operating power to the power terminals of a pre-

amplifier whose input is connected to the transducer of a grounded vortex-type flowmeter yielding a low-frequency a-c signal within a given range as a function of flow rate and for concurrently conveying the amplified low-frequency a-c signal output of the pre-amplifier to a remote terminal, said system comprising:

A. a d-c voltage source;

B. a DC-to-DC converter whose input is connected via said two-wire line to said source and whose output is connected by at least one lead to said amplifier power terminals, whereby the direct-current carried by said lead depends on the power drawn by said amplifier from said converter; said converter being constituted by a high-frequency carrier oscillator whose operating frequency is substantially higher than the highest frequency in the



low-frequency range of said flowmeter, said carrier being applied by a high-frequency isolation transformer to a full-wave rectifier whose output is fed by said lead to said power terminals, said transformer being substantially unresponsive to frequencies in said low-frequency range,

C. a load resistor connected between the output of said amplifier and said lead, said resistor drawing a sufficiently heavy current to modulate the direct-current flowing through said lead in accordance with the amplified low-frequency a-c signal flowing through said resistor, this modulation being reflected in the demand imposed by said converter on said d-c source through said line, whereby the current in said line has an a-c modulation component; and

D. means coupling said output terminal to said line to extract only the a-c modulation component therefrom.

4,015,473

MASS FLOWMETER FOR A GASEOUS MEDIUM, FOR EXAMPLE AIR

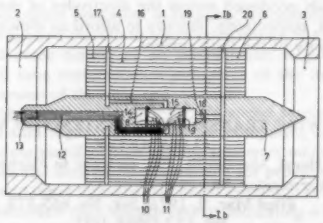
Wilhelm Josef Kleuters, and Antonius Cornelis Maria Gieles, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,108

Claims priority, application Netherlands, Nov. 6, 1974, 7414460

Int. Cl.² G01F *1/38*

U.S. Cl. 73—205 L **6 Claims**



1. Apparatus for measuring the mass flow of a gas, comprising:

a laminar restriction through which a gas may flow from an inlet side to an outlet side;

an evacuated space;

a first diaphragm in open communication on one side with said evacuated space and on the other side with the gas flowing through said laminar restriction, said first diaphragm having at least one surface electric resistance element acting as a strain gauge for measuring the pressure difference between said evacuated space and the gas flowing through said laminar restriction, said at least one resistance element of said first diaphragm having a resistance inversely proportional to temperature and being in good heat-exchanging contact with the gas flowing through said laminar restriction;

a second diaphragm in open communication on one side with the inlet side of said laminar restriction and on the other side with the outlet side of said laminar restriction, said second diaphragm having at least one surface electric resistance element acting as a strain gauge for measuring the pressure difference between the inlet and outlet side of said laminar restriction, said at least one resistance element of said second diaphragm having a resistance inversely proportional to temperature and being in good heat-exchanging contact with the gas flowing through said laminar restriction; and

circuit means for multiplying the pressure difference measured by said at least one resistance element of said first diaphragm by the pressure difference measured by said at least one resistance element of said second diaphragm, the product being a measure of the mass flow of the gas flowing through said laminar restriction.

4,015,474

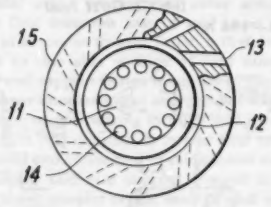
STABILIZING MEANS FOR ROTOR OF BEARINGLESS FLOWMETER

David E. Hoppe, 294 Beacon St., Boston, Mass. 02116

Continuation of Ser. No. 300,145, Oct. 24, 1972, abandoned. This application Oct. 10, 1975, Ser. No. 621,531

Int. Cl.² G01F *1/06*

U.S. Cl. 73—229 **1 Claim**



1. An improved rotor-stabilized bearingless flowmeter comprising

inlet means for receiving fluid entering said flowmeter,

at least nine circumferentially spaced jet passages adapted to respond to said fluid from said inlet means,

an operating chamber adapted to receive said fluid from said jet passages and each of said jet passages opening into said chamber through the circumferential periphery thereof at an angle with a chamber radius so that said fluid entering said chamber from said jet passage tends to rotate within said chamber while passing therethrough,

a rotor within said chamber adapted to rotate therein in a substantially stable manner in cooperation with said fluid entering said chamber from said at least nine jet passages and rotating within said chamber and passing through said chamber, and

outlet means adapted to exhaust said fluid exiting from said chamber inwardly from said circular periphery thereof whereby the action of said at least nine jet passages in cooperation with said rotor and said chamber in the

operation of said flowmeter tends to provide substantially stable rotor operation.

4,015,475

METHOD OF AND DEVICE FOR STRIPPING OFF A LOST MEASURING HEAD DETACHABLY PLACED UPON A MEASURING LANCE

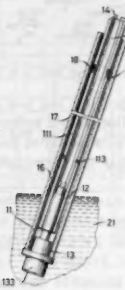
Wolfgang Pluschkell, Dortmund-Wambel, and Heinrich Wisnewski, Dortmund, both of Germany, assignors to Hoesch Werke Aktiengeselischaft, Dortmund, Germany

Filed Dec. 10, 1975, Ser. No. 639,224

Claims priority, application Germany, Dec. 10, 1974, 2458256

Int. Cl.² G01K 1/14

U.S. Cl. 73—343 R **8 Claims**



4. In combination, a measuring lance having a longitudinal bore and also having a first end section to be immersed into a melt and also a second end section forming a free sealed end section, connecting means provided at said second end section for connection with a source of compressed air, a socket fixedly mounted in said first section, a protective tubular cover surrounding said lance and said socket and protruding beyond said socket in the direction away from said second end section of said lance, a measuring head arranged within and surrounded by that portion of said tubular cover which protrudes beyond said socket in the direction away from said second lance section, said measuring head being provided with a plug member normally engaging said socket, measuring conductor lines respectively normally electrically connected to said plug member and extending through said lance for connection with a measuring device, and fluid pressure conveying means for conveying fluid pressure through said second section to said measuring head to strip the latter from said lance.

4,015,476

SCANNING PYROMETER SYSTEM

John J. Roche, and Glenn L. Hunsicker, both of Allentown, Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Nov. 8, 1974, Ser. No. 522,363

Int. Cl.² G01J 5/52

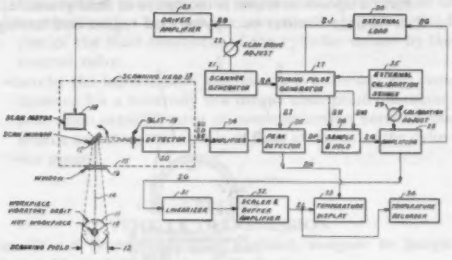
U.S. Cl. 73—355 R **12 Claims**

1. A scanning pyrometer system for determining a variable temperature of a movable hot workpiece which may experience increases or decreases in temperature at various locations in a scanning field, said system comprising:

a. means including an oscillating mirror for continuously scanning said field, and further including a detector aligned with said mirror for producing a detector output signal which varies with the temperature of said hot workpiece,

b. means for detecting and storing a new peak in the variable temperature detector output signal each scan, said means adapted to be updated each scan,

c. means synchronized only with the mirror movement in scanning means (a) for controlling the updating of means (b), and



d. means for utilizing the stored peak temperature signal to determine the temperature of said hot workpiece.

4,015,477

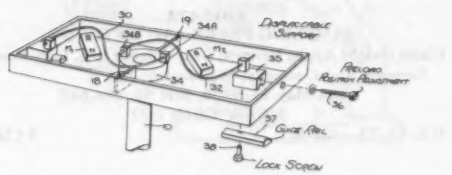
LINEAR DISPLACEMENT TRANSDUCER

W. Jorge Sitkewich, Warminster, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed Dec. 22, 1975, Ser. No. 643,133

Int. Cl.² G01L 9/16

U.S. Cl. 73—398 R **7 Claims**



1. A displacement transducer capable of accurately measuring a small movement of a displaceable element, said transducer comprising:

A. an S-shaped wire formed of magnetostrictive material and having two arc sections, one end of the wire being fixed and the other being linked to said element, whereby movement of the element results in a change in the curvature of the arcs;

B. means subjecting the wire to a stationary magnetic field;

C. an amplifier whose input is connected to one section of the wire and whose output is connected to the other section thereof, whereby electrical pulses yielded in the amplifier output produce torsional vibration in the two sections to create a sinusoidal electrical signal which is fed back to the input of the amplifier, thereby sustaining oscillations in the amplifier to produce an output signal whose frequency depends on the radius of curvature of the wire sections and is therefore a function of displacement, the relationship between the output signal and displacement exhibiting non-linear deviations; and

D. means associated with the wire to linearize the relationship between displacement and the frequency of the output signal.

4,015,478

DIRECT-ACTING PRESSURE SENSOR

Siegfried H. A. Schmaus, 806 Powder Mill Lane Penfield Downs,, Philadelphia, Pa. 19151

Division of Ser. No. 632,920, Nov. 18, 1975, Pat. No. 3,986,400. This application Apr. 27, 1976, Ser. No. 680,701

Int. Cl.² G01L 7/04

U.S. Cl. 73—418 **3 Claims**

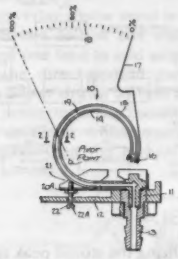
1. A fluid pressure sensor comprising:

A. inner and outer flat springs having similarly curved for-

mations and maintained in concentric relation to define a pressure region therebetween;

B. a fixed fluid input socket anchoring said springs at one end thereof, the free end of the springs being joined to form a tip whose travel is indicative of fluid pressure; and

C. a flexible bladder occupying said region and having an



internal chamber, the faces of said bladder engaging said springs and being bonded thereto avoid slide friction therebetween, thereby minimizing hysteresis, said internal chamber communicating with said fluid input socket whereby the pressure of fluid fed to said chamber through said socket applies a load on said springs producing deflection thereof whereby said tip is caused to travel.

4,015,479

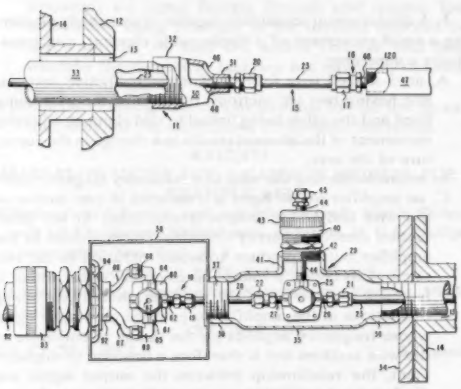
SAMPLING PROBE AND METHOD

Glenn Dwight Apple, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 13, 1976, Ser. No. 686,645

Int. Cl.² G01N *1/22*

U.S. Cl. 73—422 R **9 Claims**



1. In a probe for sampling a primary fluid located in a confined region defined by at least one wall, said probe comprising: a sample tube having a first end extending through the wall into the confined region and a second end located outside the confined region and a filter attached to the first end of said sample tube, the improvement wherein said probe further comprises:

a. a housing extending through the wall into the confined region and surrounding that portion of said sample tube located outside of the confined region, said housing being in substantially fluid-tight association with the wall and having at least one orifice connecting the interior of said housing to the confined region at a position remote from said filter;

b. a source of relatively high pressure, temperature controlled secondary fluid; and

c. valving means alternately connecting said source of secondary fluid to the interior of said housing, or to the second end of said sample tube.

4,015,480

BALANCING METHOD AND APPARATUS

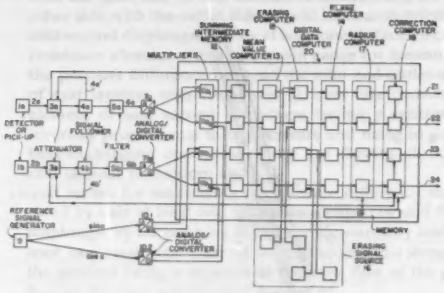
Alfred J. Giers, Rossdorf, Germany, assignor to Carl Schenck AG, Darmstadt, Germany

Filed Nov. 26, 1975, Ser. No. 635,722

Claims priority, application Germany, Dec. 14, 1974, 2459282

Int. Cl.² G01M *1/22*

U.S. Cl. 73—462 **24 Claims**



1. A method for determining the unbalance of a rotating body to be balanced and having an unbalance which causes an unbalance oscillation having an unbalance frequency, comprising producing instantaneous, unbalance representing signals, providing a reference signal having a reference period, said reference signal having a frequency equal to said unbalance frequency, producing reference values at least at three points of time during said reference period of the reference signal, said reference values representing or approximating sine and cosine reference values with respect to said reference period at said three points of time, miltiplying in a digital manner said unbalance representing signals with said sine and cosine reference values at said three points of time to produce respective sine and cosine products, separately summing in a digital manner said sine products at least during one period of said reference signal to produce a sine sum, separately summing in a digital manner said cosine products at least during one period of said reference signal to produce a cosine sum, and producing an unbalance indicating signal from said sine and cosine sums by digitally forming means values from said sums.

4,015,481

BUBBLE BALANCER

Arthur Kamin, Mundelein; Clifford A. Evans, Waukegan, and Lehner C. Freborg, Libertyville, all of Ill., assignors to Ammco Tools, Inc., North Chicago, Ill.

Filed May 24, 1976, Ser. No. 689,511

Int. Cl.² G01M *1/12*

U.S. Cl. 73—483 **8 Claims**

1. Apparatus for use in determining the condition of balance of a rotor, comprising in combination,

an upright support member,

the upper end portion of said support member having the shape of a portion of a sphere,

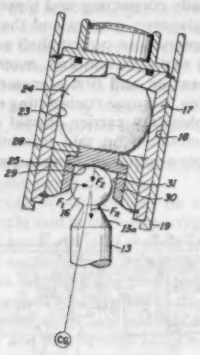
said portion exceeding 180° in the vertical direction,

a pivot head having means thereon for mounting a rotor to be balanced,

said pivot head having a downwardly opening recess defined by an annular side wall and a top wall,

said upper end portion of said support member being disposed in said recess in engagement with said top wall,

the respective dimensions of said sphere and said annular side wall being such that when said pivot head is tilted about 3° relative to the vertical said end portion of said



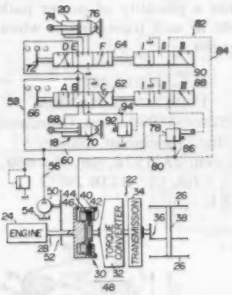
support member may simultaneously engage said annular and top walls at respective locations on said end portion angularly displaced by substantially 90° in the vertical direction.

4,015,482

CONTROL SYSTEM FOR POWER TRAIN AND AUXILIARY EQUIPMENT DRIVEN FROM A COMMON PRIME MOVER

Ryuji Ito, Ebina, and Mitsuaki Komatsu, Yokohama, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Apr. 12, 1976, Ser. No. 675,884
Claims priority, application Japan, Apr. 14, 1975, 50-44248
Int. Cl.² F16H *37/00*
U.S. Cl. 74—15.84 **8 Claims**



1. In combination with a power train driven by a prime mover and including a variable torque absorption transmission mechanism which has an actuating chamber effective to vary the torque absorption characteristic of the transmission mechanism in response to variable fluid pressure supplied thereto, a system comprising:

a source of fluid under pressure;

means operatively connecting the source to the power train at a point intermediate the prime mover and the transmission mechanism whereby the source is driven by the prime mover;

at least one control valve operatively connected to the source;

fluid actuated cylinder means operatively connected to the control valve and having a pair of opposed fluid chambers, the control valve being adapted to control communication between the source and the fluid chambers of the cylinder means;

a variable pressure regulator valve through which the source communicates with the actuating chamber of the transmission mechanism; and

means for causing the pressure regulator valve to vary the fluid pressure supplied to the actuating chamber of the transmission mechanism in response to establishment of communication between the source and a predetermined one of the fluid chambers of the cylinder means by the control valve;

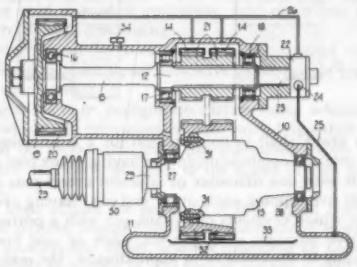
whereby the transmission mechanism is automatically conditioned for a relatively low torque absorption characteristic upon establishment of communication between the source and the predetermined fluid chamber of the cylinder means.

4,015,483

VEHICLE TRANSMISSION

Peter Stuart Warner, Henlow, England, assignor to Joseph Lucas Limited, Birmingham, England

Filed Nov. 25, 1975, Ser. No. 635,231
Claims priority, application United Kingdom, Nov. 29, 1974, 51715/74
Int. Cl.² F16H *57/04*; F01M *9/10*
U.S. Cl. 74—230 **5 Claims**



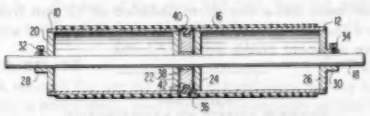
1. A vehicle transmission comprising a casing including a sump for lubricating fluid, a rotary shaft and a differential unit mounted one above the other in said casing, at least one drive operatively interconnecting said differential unit and said rotary shaft, said rotary shaft, differential unit and drive means being disposed above a normal lubricant level in the sump, and a lubricating fluid pump driven by said shaft, said pump having an inlet communicating with the sump, and an outlet arranged in use to discharge pressurized lubricating fluid onto moving parts of the transmission internally of the casing.

4,015,484

GUIDE PULLEY FOR WIDE BELTS

Miller Taylor, c/o Taylor Tobacco Enterprises Inc., Highway 701 South, Elizabethtown, N.C. 28337

Filed Feb. 20, 1976, Ser. No. 659,879
Int. Cl.² F16H *55/36, 7/18*
U.S. Cl. 74—230.3 **4 Claims**

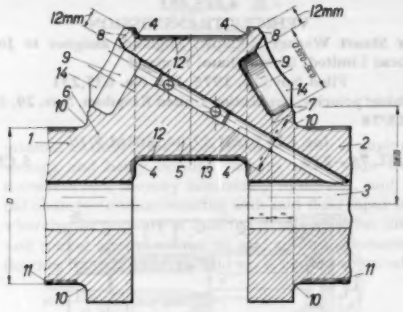


1. A composite pulley for a wide flat belt having a longitudinally disposed central rib on one surface thereof comprising a pair of coaxial spaced apart cylindrical pulley portions adapted to support the wide belt on opposite sides of the central rib and grooved pulley means coaxially disposed intermediate and freely rotatable relative to said cylindrical pulley portions adapted to receive and guide said central rib.

4,015,485
CRANK SHAFT FOR A MULTI-CYLINDER SHORT STROKE INTERNAL COMBUSTION ENGINE

Karl Ganter-Ullmann, Cologne; Paul Neussel, Langenfeld; Hubert Abermeth; Jürgen Wahnschaffe, both of Cologne, and Heiner Klier, Bensberg-Refrath, all of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed July 24, 1975, Ser. No. 598,565
Claims priority, application Germany, July 24, 1974, 2435476
Int. Cl.² F16C 3/04; F16F 3/14
U.S. Cl. 74—596 4 Claims



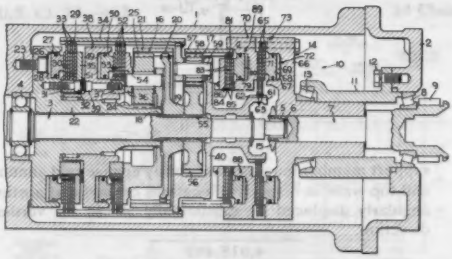
1. A crank shaft in combination for a multicylinder short stroke internal combustion engine having crank pins and shaft journals with one diameter of adjacent crank pins and shaft journals overlapping each other and also having crank webs each of which connects one crank pin with a portion of one respective adjacent shaft journal, each of said crank webs decreasing in thickness from approximately the middle of the crank pin with increasing distance from the shaft center, each of said crank webs within the region of the respective adjacent crank pin portion being provided with a blind bore forming a relief bore having its axis inclined with regard to the axis of the respective adjacent shaft journal so as to confine therewith an acute angle, each of said relief bores having a flat bottom surface and a circumferential surface merging with said flat bottom surface along a transitional rounded surface section with that merging surface which is closest to the area of the respective nearest shaft journal being located approximately in a plane perpendicular to the longitudinal axis of said crank shaft and approximately in the middle of each crank web between the respective adjacent crank pin and said last mentioned shaft journal, while with a diameter ratio of crank pin to shaft journal amounting to 0.8 the diameter of said relief bores corresponds to from 0.35 to 0.55 times the diameter of the respective adjacent shaft journals but with its maximum being limited to such a value that the overlapping of the respective relief bore with the outer contour of the respective adjacent web is spaced from the shaft axis by a minimum distance of 0.6 times the diameter of the shaft journal while each relief bore has a minimum distance of 12 mm from the respective section over which the crank pin merges with the respective adjacent crank web.

4,015,486
POWER SHIFT TRANSMISSION

George O. Zach, Jr., Hales Corners, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 19, 1974, Ser. No. 534,555
Int. Cl.² F16H 3/44, 57/10
U.S. Cl. 74—753 10 Claims

1. A planetary transmission comprising a transmission housing, a first planetary gearset and a second planetary gearset each having a sun gear mounted on a common axis, each planetary gearset including a sun gear, a ring gear, a planetary carrier, and planet gears mounted on the planetary carrier, an input shaft rotatably mounted for rotation about said common axis, means integrally connecting said input shaft to the ring gear of said first planetary gearset and the sun gear of said second planetary gearset, an output shaft rotatably mounted for rotation about said common axis, means integrally connecting the sun gear on said first planetary gearset to said transmission housing, a torque transmitting member interconnected with the planetary carrier of said second planetary gearset, a brake mounted on said transmission housing, a clutch selectively connecting said planetary carrier of said first

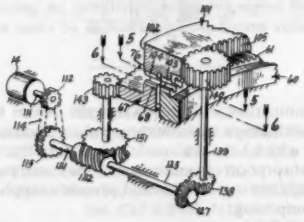


planetary gearset with said torque transmitting member, a friction member in each of said brake and said clutch connected to said torque transmitting member, a clutch carrier integrally connected to said output shaft and mounted for rotation about said common axis, a plurality of clutches carried on said clutch carrier, a friction member carried on each of said ring gear and said planetary carrier of said second planetary gearset forming an element in each of said clutches in said clutch carrier, hydraulic means for selectively and alternatively actuating said brake and clutches to thereby selectively provide a plurality of power paths through said planetary gearsets in said transmission when said brake or clutches are engaged.

4,015,487
INDEX MECHANISM

Stanley Arthur Pfister, Wilmington, Ohio, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed Feb. 23, 1976, Ser. No. 660,399
Int. Cl.² B23B 29/32
U.S. Cl. 74—813 L 2 Claims



1. In a mechanism for positioning and securing an indexable machine member against rotation with respect to a base member, said mechanism comprising a first coupling element connected to the base member and including a first annular array of teeth, a second coupling elememt connected to the indexable machine member and including a second annular array of teeth disposed in a concentric relationship with an axis of rotation of the indexable machine member and with said first annular array of teeth, a third coupling element disposed in a concentric relationship with the axis of rotation of the machine member and with said first and second annular arrays of

teeth, said third coupling element including tooth means for meshing engagement with at least a portion of said first and second annular arrays of teeth to position and secure the machine member in a selectable predetermined position with the base member, and means for affecting axial movement between said third coupling element and at least one of said annular arrays of teeth to move said tooth means into and out of meshing engagement with at least one of said annular arrays of teeth, and further having means to index said indexable machine member, an improved fine resolution index mechanism comprising:

a. unequal numbers of uniformly spaced teeth on said first and said second arrays of teeth;

b. first and second tooth portions on said third coupling element wherein said first tooth portion is coequal to said first array of teeth and said second tooth portion is coequal to said second array of teeth; and

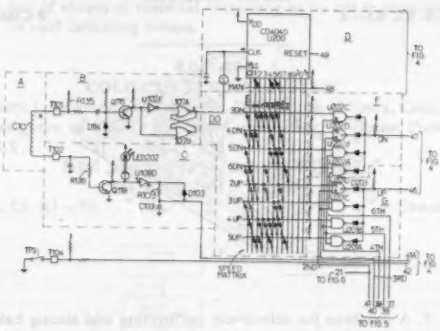
c. means to drive said third coupling element about said axis at a predetermined speed ratio relative to said indexable machine member when said member is indexed, wherein said member and said second coupling element may be indexed to successive angular increments corresponding to the angular difference in respective tooth spaces on said first and second arrays of teeth.

4,015,488

DIGITAL ELECTRONIC CONTROLLER FOR POWER TRANSMISSION

Richard C. Akeson, Brookfield, and Robert W. Hockenbury, Milwaukee, both of Wis., assignors to Twin Disc, Incorporated, Racine, Wis.

Filed Sept. 29, 1975, Ser. No. 617,429
Int. Cl.² B60K *41/06*
U.S. Cl. 74—866 **4 Claims**



1. In combination:

a prime mover;

accelerator means operable to regulate the speed of said prime mover;

a gear shift mechanism driven by said prime mover and shiftable in a manual gear range including neutral and reverse and shiftable in an automatic gear range including a plurality of speed ranges above neutral;

electrically actuatable devices for shifting said mechanism into any gear of said manual and automatic gear ranges;

a range selector switch selectively movable to any one of a plurality of gear range positions and for providing an electrical range signal indicative of the gear range position selected;

speed sensing means for providing an electrical speed signal indicative of the output speed of said mechanism, said speed sensing means providing a pulsed electrical speed signal whose frequency is indicative of the output speed of said mechanism;

means for providing an electrical acceleration signal indicative of whether said accelerator means is being operated or not to effect regulation of the speed of said prime mover;

and electronic digital control means to provide control signals for actuating said devices, said control means including a signal pattern recognition circuit having an upshift section and a downshift section: said control means effecting operation of said mechanism in any gear in said manual gear range solely in response to said range signal;

said control means effecting upshift operation of said mechanism to any gear in said automatic gear range in response to said range signal, said speed signal and an acceleration signal indicative that said prime mover is being accelerated, said acceleration signal indicative that said accelerator means is being operated enabling said upshift section of said signal pattern recognition circuit to effect said upshift operation;

and said control means effecting downshift operation of said mechanism to any gear in said automatic gear range in response to said range signal, said speed signal, and an acceleration signal indicative that said prime mover is not being accelerated, said acceleration signal indicative that said accelerator is not being operated enabling said downshift section of said signal pattern recognition circuit to effect said downshift operation, said electronic digital control means comprising:

a counter circuit for receiving said speed signal and for providing a count signal indicative of the output speed of said mechanism:

said signal pattern recognition circuit being adapted for receiving said count signal and for providing a shift signal based on recognition of a predetermined count signal pattern and corresponding to the speed of said mechanism;

a shift logic circuit for receiving a shift signal from said signal pattern recognition circuit, said range signal and said acceleration signal, and for providing an upshift or downshift indicative of whether or not the output speed of the mechanism corresponds to the selected gear range and indicative, in the case of an upshift signal, of whether or not the prime mover is being accelerated;

an up/down counter circuit for receiving said upshift or downshift signal from said shift logic circuit and for providing an output signal indicative of which gear range should be employed;

and a decoder circuit for receiving said output signal and for providing control signals for operating said devices to effect shifting of said gear shift mechanism.

4,015,489

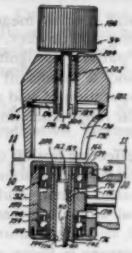
DENTAL HANDPIECE AND WRENCH THEREFOR

Nathaniel H. Lieb, Narberth; Franklin W. Kerfoot, Jr., Newtown Square, and Richard A. Wallace, Audubon, all of Pa., assignors to Star Dental Manufacturing Co., Inc., West Conshohocken, Pa.

Division of Ser. No. 476,749, June 5, 1974, Pat. No. 3,947,966, which is a division of Ser. No. 217,745, Jan. 14, 1972. This application July 25, 1975, Ser. No. 599,265
Int. Cl.² B25B *27/00*
U.S. Cl. 81—55 **5 Claims**

1. A wrench for use on a dental handpiece having a turbine housing, a rotor shaft, and a collet threadedly secured in said rotor shaft, said wrench comprising a housing, said wrench housing being adapted to be placed over the turbine housing of said dental handpiece, a tube mounted in said wrench housing, said tube being secured to said wrench housing, said wrench housing having a cavity formed therein, means within said cavity for securing said wrench housing on said turbine housing, said securing means comprising a spring, said spring being positioned within a groove formed in the wall of said cavity, said tube having a finger which is adapted to be re-

ceived in a slot in the rotor shaft of said handpiece, and a shaft rotatably mounted within said tube, said shaft being adapted



to threadedly advance or retract said collet relative to said rotor shaft.

4,015,490

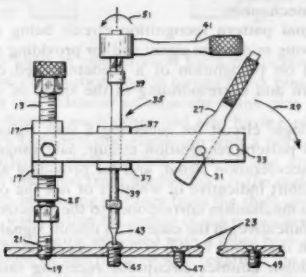
SCREW REMOVAL TOOL

William R. Burrous, 4702 Sharynne Lane, Torrence, Calif. 90505

Filed Mar. 4, 1976, Ser. No. 663,638

Int. Cl.² B25B *13/48, 15/00*

U.S. Cl. 81—180 R **3 Claims**



1. A screw removal tool removing difficult to remove screws in hard to reach areas comprising, a horizontally disposed beam member in spaced parallel relationship to the workpiece, a free turning vertically oriented shaft positioned at one end of said beam member, an inserting screw attached to the lower end of said free turning shaft for insertion into a threaded opening in the workpiece, a lever handle attached to the other end of said beam ember for applying downward pressure thereto, and a driver assembly positioned on said main beam member between said handle and said free turning shaft, said driver assembly including a slide block disposed on said beam member to permit said driver assembly to be axially aligned over the difficult to remove screw and rotated while applying downward pressure to said lever handle thereby causing the screw to be loosened.

4,015,491

TURRET LATHE

Fernand Peter, Mulhouse, France, assignor to Manurhin-Automatic, S.A., Mulhouse-Cedex, France

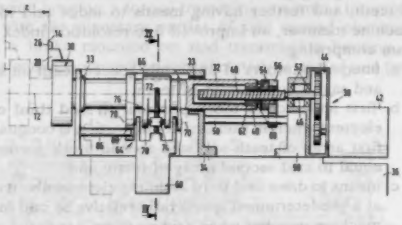
Filed Apr. 8, 1976, Ser. No. 675,182

Claims priority, application France, June 13, 1975, 75.18552

Int. Cl.² B23B *3/18*

U.S. Cl. 82—2 R **10 Claims**

1. In a turret lathe having a fixed frame, a lathe spindle mounted for rotation on the frame, a tool-carrying turret mounted on a turret-carrying shaft which is parallel to the spindle of the lathe, such shaft being adapted for translational movement along its axis under the action of a longitudinal advancing mechanism and angular displacement around its axis under the action of a transverse advancing mechanism, the improvement wherein the transverse advancing mechanism comprises an oscillating arm which is adapted to be fixedly connected to the turret-carrying shaft, a driving means



having a driving rod, the arm being connected at its extremity by an articulating means to the driving rod of the driving means, the driving means being pivotally mounted around a second axis fixed parallel to the axis of the turret-carrying shaft, the second axis being separated from the axis of such shaft by a distance R equal to that which separates it from the axis of the articulating means connecting the free extremity of the oscillating arm to the driving rod.

4,015,492

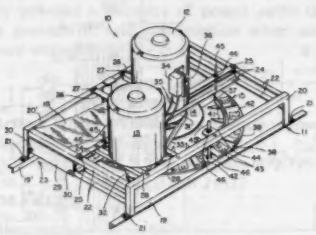
MUFFIN SLICER AND PERFORATOR

John Terragnoli, 103 Wallace Ave., Buffalo, N.Y. 14214

Filed Feb. 5, 1976, Ser. No. 655,555

Int. Cl.² B26D *3/08*

U.S. Cl. 83—2 **9 Claims**

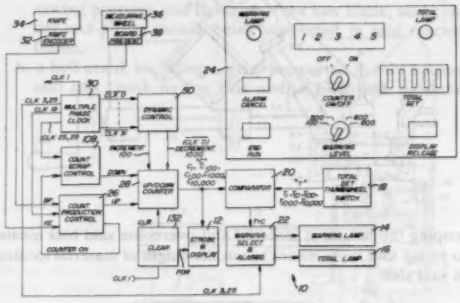


7. A machine for selectively perforating and slicing baked goods, such as muffins and buns, adapted to be mounted on a conveyor of a baked goods production line which delivers such baked goods to the machine and removes them from it, which comprises perforating means, slicing means, means for directing the baked goods selectively into contact with the perforating means or the slicing means so as to perforate and slice said goods, a framework and motor driving means for the slicing means, in which the perforating means includes a plurality of perforating knives mounted on a support and arranged so that when the baked goods are being perforated they travel along a path past said knives so that they are pierced and perforated by said knives in such manner as to make separation of halves of the individual baked goods readily effected, the slicing means includes a cutting wheel adapted to slice the baked goods when said goods are passed past the cutting wheel and the selectively directing means includes a guide for selective movement into a position wherein forward movement of the conveyor selectively moves the baked goods past the perforating means or past the slicing means, depending on the position of the guide with respect to the conveyor supporting surface.

4,015,493
DYNAMIC PRODUCTION COUNTER FOR A CORRUGATOR

Allan Brent Woolston, Wynnewood, Pa., assignor to Molins Machine Company, Inc., Camden, N.J.

Filed Mar. 15, 1976, Ser. No. 666,847
Int. Cl.² B26D 7/28
U.S. Cl. 83—13 13 Claims

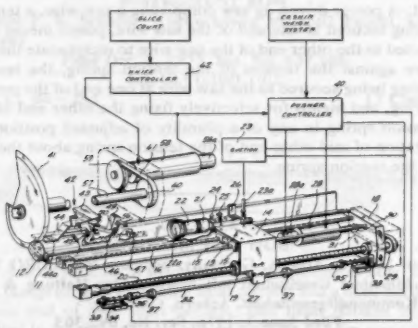


11. An improved method of indicating the number of sheets of moving material automatically cut by a knife, comprising:
generating a first digital signal indicative of a predetermined number of sheets of material to be cut by the knife;
providing a second digital signal indicative of the number of sheets of material cut by the knife;
cyclically incrementing and decrementing said second digital signal by predetermined counts to cause said second digital signal to cyclically vary;
detecting coincidence of said cyclically varied second digital signal to said first digital signal; and
generating a warning signal indicative of a preselected number of sheets of material remaining to be cut in response to said detecting means.

4,015,494
COLD CUT SLICING SYSTEM

Robert J. Spooner, and Oscar W. Dillon, both of Essex, Conn., assignors to Cashin Systems Corporation, Williston Park, N.Y.

Filed June 24, 1975, Ser. No. 589,831
Int. Cl.² B26D 5/20, 4/50
U.S. Cl. 83—76 2 Claims

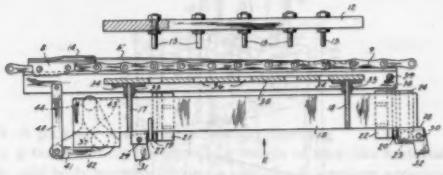


1. In a slicing machine having a slicing blade for slicing a loaf of meat product and feeding means for pushing the said loaf to be sliced into the slicing blade the improvement for holding down the loaf of meat and preventing the rotation of such loaf comprising
a. a hold down plate positioned adjacent the slicing blade and applying pressure to the top of the loaf;
b. a lifter to raise the hold down plate when the slicing operation has been completed and only the butt of the loaf remains; and
c. actuator means associated with the feeding means to actuate the said lifter at the conclusion of the slicing operation
whereby the hold down plate will be clear of the butt end of the loaf and permit the feeder and butt to move backward.

4,015,495
DEVICE FOR STRIPPING WASTE FROM A SHEET DIE CUT ON A PLATEN PRESS

Marcel Yerly, Renens, Switzerland, assignor to J. Bobst & Fils S.A., Switzerland

Filed Feb. 14, 1975, Ser. No. 549,972
Claims priority, application Switzerland, Mar. 7, 1974, 003251/74
Int. Cl.² B26D 7/06; B31B 1/00
U.S. Cl. 83—103 11 Claims

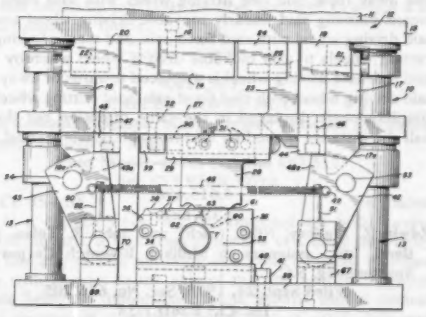


1. A platen press including a station having a vertically movable lower part, a cooperating upper part, conveying chains adjacent opposed side edges of said upper and lower parts, a gripper bar supported at its ends by said chains and having means for holding a sheet in a position between said parts, chain support guides underlying each of said chains and supporting said chains in said press, each of said chain support guides having ends and means for moving at least one end of each of said chain support guides toward and away from said upper part as said movable lower part moves toward and away from said upper part.

4,015,496
DIMPLELESS TUBE CUTOFF DEVICE

Donald R. Hill, Elmhurst, Ill., assignor to Hill Engineering, Inc., Addison, Ill.

Filed Feb. 6, 1976, Ser. No. 655,885
Int. Cl.² B26D 3/16
U.S. Cl. 83—466.1 14 Claims



8. Tube cutoff apparatus comprising:
means for supporting a tube to be cut;
a cutoff blade having a notching tip portion and a slicing edge portion extending away from said notching tip portion;
support means for supporting the blade transaxially adjacent the tube;

means for moving said blade on said support means to cause said notching tip portion to move in a first direction chordally through a portion of the tube to notch said tube portion; and

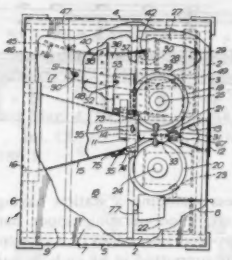
means for moving the blade support means to move the blade in a second direction suitably to cause said slicing edge portion to slice through the notched tube commencing from the notched portion and continuing therefrom through the remainder of the tube to complete the cutoff operation.

4,015,497

CABLE STRIPPING MACHINES WITH LINKED CUTTING AND DRIVING WHEELS

John E. Burgess, South Broughton, England, assignor to Cleveland Marine Limited, South Broughton, England

Filed May 12, 1976, Ser. No. 685,602
Int. Cl.² H02G *1/12*
U.S. Cl. 83—425.2 **26 Claims**



1. In a machine for stripping automatically the sheath from metal cored cables, said machine comprising a pair of driving wheels, opposed peripheries of said driving wheels defining a nip through which, in use, a cable to be stripped is fed by said driving wheels, a pair of opposed cutting wheels, and a peripheral cutting edge on each of said cutting wheels projecting into the region of said nip substantially midway between said driving wheels whereby, as a cable is fed through said nip, the sheath of said cable is slit by said peripheral cutting edges of said cutting wheels continuously along the length of said cable on opposite sides of said cable to enable said sheath to separate from the core of said cable, the improvement wherein said machine includes means mounting one of said driving wheels for rotation about a fixed axis, means mounting the other of said driving wheels for movement linearly towards and away from said one driving wheel with said fixed axis, means biassing said linearly movable driving wheel towards said driving wheel with said fixed axis, and means linking said cutting wheels to said movable driving wheel whereby when said movable driving wheel is displaced towards or away from said driving wheel with said fixed axis, said cutting wheels are simultaneously displaced in the same direction but through half the distance moved by said movable driving wheel.

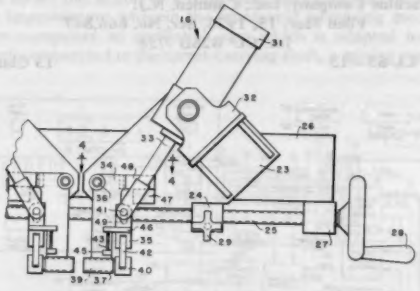
4,015,498

CUTTER

Edwin E. Mallory, Niles, Mich., and John R. Tolan, South Bend, Ind., assignors to Milliken Research Corporation, Spartanburg, S.C.

Filed Sept. 24, 1975, Ser. No. 616,205
Int. Cl.² B26D *1/38*
U.S. Cl. 83—564 **2 Claims**

1. Apparatus to cut a length of material comprising: a frame, anvil means pivotally secured to said frame out of the path of travel of the length of material, knife means rotably supported within said anvil means, said anvil means having a slot therein adjacent said knife means, bias means operably associated with knife means to prevent the actuation of said knife means until said anvil is pivoted into position with the slot telescoping the length of the material, means to automatically pivot said anvil means into a position with said slot telescoping the length of material and overcome said bias means to rotate said knife means to cut the length of material located in said slot.

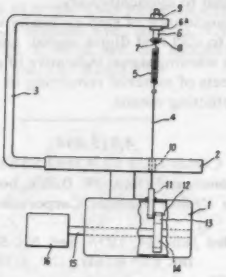


4,015,499

DEVICE FOR MOUNTING ON A MACHINE TO ALLOW THE MACHINE TO BE USED AS A SAW

Jacques Arthaud, 5, Allee du Bresil, 91300 Massy, France

Filed Nov. 3, 1975, Ser. No. 628,428
Int. Cl.² B27B *19/02*
U.S. Cl. 83—752 **4 Claims**



1. A power driven jig saw comprising a saw wire, a tension spring secured to one end of the saw wire, power means connected to the other end of the saw wire to reciprocate the saw wire against the tension of the tension spring, the tension spring being secured to the saw wire at one end of the tension spring, and means for selectively fixing the other end of the tension spring in any of a plurality of adjusted positions of rotation of said other end of the tension spring about the axis of the tension spring.

4,015,500

BOW SAW MACHINE

Paul Stolzer, Achern, Germany, assignor to KEURO Maschinenbau Gesellschaft mit beschrankter Haftung & Co., Kommanditgesellschaft, Achern, Germany

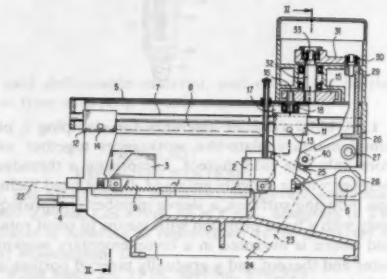
Filed June 3, 1976, Ser. No. 692,303
Int. Cl.² B23D *51/20*
U.S. Cl. 83—755 **11 Claims**

1. In a bow saw machine having a machine frame; means for immobilizing a workpiece in the machine; a housing; means for pivotally attaching the housing to the machine frame for providing for a swinging motion of the housing generally in a vertical plane; a saw bow supporting a saw blade in a generally horizontal orientation during the sawing operation; guide

means supported in said housing for longitudinally displaceably mounting the saw bow; a drive motor; a crank drive supported in the housing and having a first eccentric coupled to the saw bow for effecting a reciprocating motion thereof along a path of reciprocation determined by the guide means; the crank drive being located above the saw bow substantially within the zone of its path of reciprocation; the improvement comprising

a. a hydraulic cylinder-and-piston means for controlling the sawing pressure and the feed of the saw blade; said cylinder-and-piston means being supported in said machine frame;

b. a bell crank including a pivot supported in said housing; said bell crank having first and second arms extending



from said pivot and being arranged at an angle to one another; each arm having an outer end; the outer end of said first arm of said bell crank being pivotally connected to said cylinder-and-piston means; and

c. a horizontal push rod having first and second ends; said first end of said push rod being connected to a second eccentric of said crank drive for effecting a horizontal reciprocating motion of said second end of said push rod; said second end of said push rod being articulated to the outer end of said second arm of said cylinder-and-piston means for lifting said saw blade off the workpiece during each idle stroke of the saw bow and for lowering the saw blade into a sawing position for the beginning of each work stroke.

4,015,501

INJECTION MOLDED STICK FOR STRINGED MUSICAL INSTRUMENT BOW

Helmut F. K. Schaller, Kuckucksweg 16, 8501 Feucht, Germany

Filed Dec. 2, 1975, Ser. No. 637,106
Int. Cl.² G10D *1/02*
U.S. Cl. 84—282 **17 Claims**

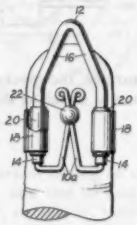
1. A bow stick for a stringed musical instrument bow, said stick comprising an elongated shaft portion and a head portion at one end of said shaft portion, said head portion being adapted to receive and hold one end of a set of hairs extending from said head portion to a frog carried by the other end of said shaft portion, said shaft portion along at least a major part of its length having a hollow longitudinally extending interior bore and being made of two different materials located in two different zones in a transverse cross section through said shaft portion, one of said materials being a strengthening material and the other of said materials being a moldable plastic material molded to said strengthening material so as to integrally fix said two materials to one another, said head portion of said stick being molded of the same plastic material as, and being of one piece with, said plastic material of said stick portion.

4,015,502

PICK FOR STRING INSTRUMENTS

Jack C. Strong, P.O. Box 251, Brightwood, Oreg. 97011

Continuation-in-part of Ser. No. 563,336, May 5, 1975, abandoned. This application May 24, 1976, Ser. No. 689,137
Int. Cl.² G10D *3/16*
U.S. Cl. 84—322 **8 Claims**



1. A pick for string instruments comprising

a. a body member formed of a length of wire-like material,

b. said body member having a pair of side portions arranged to engage longitudinally the under portion of a finger adjacent each side,

c. said body member also having a front projecting portion leading from said side portions formed into a string picking head,

d. and a strap arranged to extend laterally over the top and down the sides of a musician's finger,

e. said strap having opposite end portions attached to respective side portions of said body member for holding said body member firmly on the finger for picking,

f. said strap being flexible for contoured fitting over the musician's finger.

8. A pick for string instruments comprising

a. a body member formed of a length of wire-like material,

b. said body member having a pair of said portions arranged to engage longitudinally the under portion of a finger adjacent each side,

c. said body member also having a front projecting portion leading from said side portions formed into a string picking head,

d. said picking head having a resilient picking surface,

e. and means on said body member arranged to attach it to a musician's finger.

4,015,503

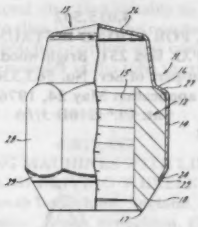
CAPPED WHEEL NUT

Ralph Romano, Brighton, Mich., assignor to Grand Machining Company, Detroit, Mich.

Filed May 3, 1976, Ser. No. 682,517
Int. Cl.² F16B *37/14*
U.S. Cl. 85—35 **4 Claims**

1. In a capped wheel nut, a polygonal nut body having internal threads, a first conical surface extending outwardly from one end of said nut body at a predetermined included angle with respect to the axis of the nut, said first conical surface being so dimensioned as to interfit with a conical wheel depression, a second conical surface axially adjacent said first surface and extending outwardly therefrom toward the other end of said nut body but at a substantially lesser included angle with respect to said axis than said first surface, a notched portion on said nut body interconnecting the outer end of said first conical surface and the inner end of said second conical surface, said notched portion being formed by a reversely conical surface extending transversely to said first

and second conical surfaces, a domed cap having sides closely interfitting with the sides of said polygonal nut body, and portions on said cap swaged into the notch formed by said



reversely conical surface, the reversely conical surface having a width approximately equal to the metal thickness of said cap.

4,015,504

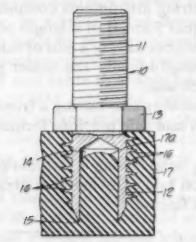
SELF-BORING FASTENER AND METHODS OF USE THEREOF

José Rosán, Sr., San Juan Capistrano, and Marvin P. Reece, Dana Point, both of Calif., assignors to Rosan Hydraulics Inc., Newport Beach, Calif.

Continuation-in-part of Ser. No. 415,978, Nov. 15, 1973, abandoned. This application Apr. 11, 1975, Ser. No. 567,415

Int. Cl.² F16B *25/00*

U.S. Cl. 85—42 **19 Claims**



1. A self-boring fastener for installation in a boreless workpiece, comprising in combination;

a workpiece composed of wood, rubber or synthetic plastic materials, and an elongated cylindrical element mounted within said workpiece, said cylindrical element having at least one end thereof provided with an axial cavity so as to form a continuous curcumferential wall member having an opened end and an oppositely disposed closed end wherein a compression chamber is defined by said axial cavity;

said wall member being provided with a longitudinally extending knife edge at the open extremity thereof;

said elongated cylindrical element being provided with a thin knife-edge element helically positioned about the outer periphery of said cylindrical element;

driving means carried by said cylindrical element to rotatably embed the fastener in a workpiece; and

a compressed core of workpiece material within said compression chamber.

4,015,505

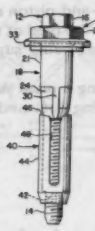
ONE SIDED FASTENER DEVICE

Pierre Charles Murray, Elgin, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Feb. 23, 1976, Ser. No. 660,203

Int. Cl.² F16B *13/04*

U.S. Cl. 85—77 **7 Claims**



1. A blind fastener assembly for clamping a plurality of complementary plate-like workpieces together with access from only one side thereof, comprising a threaded fastener member with a radially enlarged driving head including rotation inducing surfaces, a sleeve member comprising a tubular body with a head provided with means to resist rotation when said sleeve is mounted in a complementary workpiece at an outer end thereof and a gradually tapered portion at its distal end, the tapered portion of said sleeve comprising two frustoconical sections of different and successively greater angles of taper from the body to the distal extremity of said sleeve, the body of the sleeve member being generally cylindrical of a predetermined diameter substantially equal to the diameter of apertures formed in the complementary workpieces, the threaded fastener member extending through the sleeve so that the distal end of the fastener projects beyond the distal end of the sleeve, the tapered portion including rib means formed thereon and extending generally longitudinally thereof to the free extremity of the sleeve, an expansion member including an internally threaded first end portion threadingly engaging the distal end of the fastener and a workpiece clamping second end portion, said second end portion being generally tubular with an outer diameter substantially equal to the predetermined diameter of the sleeve body and an inner diameter greater than the diameter at the free extremity of the tapered section but less than the diameter at the juncture of the two frustoconical sections, generally longitudinally extending slot means extending through the second end portion toward the first end portion, the slot means forming a pair of wing-like tubular segments adapted to be deflected radially outwardly as the expansion member is pulled upwardly over the tapered section of the sleeve as a result of rotation of the screw relative to the expansion member, the slot and rib means coacting to prevent relative rotation between the expansion member and sleeve member, the uppermost edge of each wing-like tubular segment being convex toward the head of the sleeve thereby lying in a plane inclined downwardly toward the slot when the expansion member is in an unexpanded condition but adapted to lie in a plane substantially perpendicular to the axis of the fastener assembly when expanded to clamp the bottommost plate with line contact.

4,015,506

METHOD OF FORMING BARRIER WIRE

Daniel D. Musgrave, 8201 Caraway St., Cabin John, Md. 20731

Filed Apr. 12, 1976, Ser. No. 676,067

Int. Cl.² F41H *11/08*

U.S. Cl. 89—1 A **10 Claims**

1. A method of forming barrier wire comprising wrapping a

grooved strip of deformable material helically around a strand of flexible material, providing explosive means located in-

wardly of said deformable material, and deforming barrier portions out from said strip by said explosive means.

4,015,507

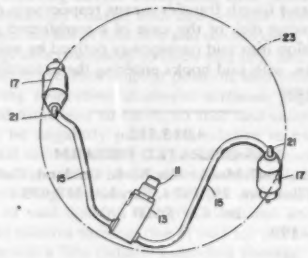
EJECTION SYSTEM

Henry Toy, Los Altos; Phillip Bernstein, Sunnyvale, and Johan C. Van der Zwaan, Los Altos, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 25, 1976, Ser. No. 670,321

Int. Cl.² F41F *5/00*; **B64D** *1/02*

U.S. Cl. 89—1.5 F **6 Claims**



1. An ejection system which comprises:

a. a cartridge;

b. said cartridge mounted at its lower portion to a manifold chamber to contain gases when emergent therefrom;

c. said manifold chamber having a pair of apertures;

d. a manifold tube having two sections, the end of each section joining said manifold chamber at one of said apertures, and having a diameter such that said two sections function as one chamber; and

e. a pair of thrusters, each joined to the other end of one of said sections of said manifold tube and mounted to a carrier at such an angle to provide desired linear and rotational force components to a projectile.

4,015,508

BURST DISPERSION CONTROL

Fredrick M. Blodgett, Jr., Essex Junction, and Peter B. Schuyler, Richmond, both of Vt., assignors to General Electric Company, Burlington, Vt.

Filed Sept. 29, 1975, Ser. No. 617,475

Int. Cl.² F41D *7/04*

U.S. Cl. 89—12 **6 Claims**

1. A gun comprising:

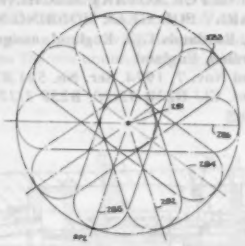
a stationary housing;

a rotor having a plurality of longitudinally extending gun barrels and journaled for rotation about a longitudinal axis within said housing; and

control means operable while said rotor is operating for varying the longitudinal alignment of at least one of said gun barrels with respect to said longitudinal axis;

said control means including

a muzzle constraint adjacent each of said barrels at its respective distal end,



said muzzle constraint having an oversize diameter bore receiving said one of said gun barrels and permitting free, cantilever, transverse vibrational movement of the distal end of said one of said gun barrels within said bore.

4,015,509

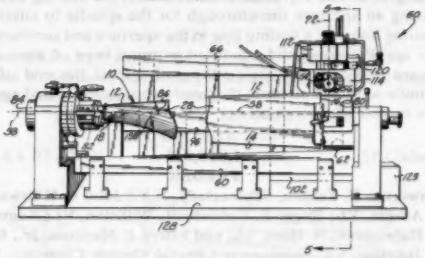
METHOD AND APPARATUS FOR SHAPING AN AIRFOIL

Eugene J. Malinowski, Richmond Heights, and Raymond J. Zyck, Willowick, both of Ohio, assignors to TRW Inc., Cleveland, Ohio

Filed Oct. 23, 1974, Ser. No. 517,388

Int. Cl.² B23C *1/16*, *1/00*

U.S. Cl. 90—13.5 **32 Claims**



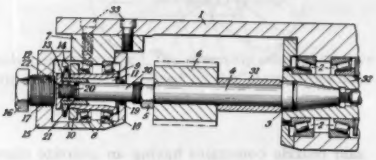
1. An apparatus for use in shaping an airfoil having major side surfaces interconnected by an arcuately bowed and longitudinally extending edge portion which bows transversely to the major side surfaces, said apparatus comprising a rotatable forming tool, means for supporting said forming tool for rotation about its central axis, means for providing for engagement of said forming tool with the arcuately bowed edge portion of the airfoil throughout the length of the arcuately bowed edge portion by effecting relative movement between said forming tool and airfoil while maintaining said forming tool in engagement with the arcuately bowed edge portion of the airfoil, and means for maintaining the central axis of said forming tool in the same angular orientation relative to an arcuately bowed longitudinal central axis of the edge portion of the airfoil during engagement of said forming tool with the arcuately bowed edge portion of the airfoil throughout the length of the arcuately bowed edge portion of the airfoil, said means for maintaining the central axis of the forming tool in the same angular orientation relative to an arcuately bowed longitudinal axis of the edge portion of the airfoil including means for varying the angular orientation of the central axis of the forming tool relative to a straight line extending between opposite

ends of the arcuately bowed edge portion of the airfoil during relative movement between said forming tool and the arcuately bowed edge portion of the airfoil.

4,015,510
MOUNTING FOR ROTARY MACHINE TOOL PARTICULARLY FOR GEAR HOBBING MACHINES

Brian Hodgson, Rowlands Gill, England, assignor to Charles Churchill Limited, England

Filed Nov. 7, 1974, Ser. No. 521,870
Int. Cl.² B23B *31/20*; B23F *5/22*
U.S. Cl. 90—20.5 **3 Claims**



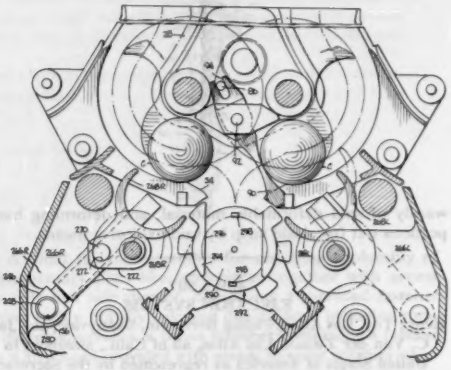
1. A tool mounting for a gear hobbing machine which comprises a hobbing spindle, a hob detachably mounted on said spindle, a bearing assembly supporting the outboard end of said hobbing spindle, a supporting member and means detachably connecting said bearing assembly to said supporting member, said bearing assembly including a bearing housing, a bearing sleeve surrounding the spindle, live bearing elements interposed between the bearing sleeve and the bearing housing, wedge means between the bearing sleeve and the spindle, means urging said wedge means to a position in which it eliminates significant radial play between the bearing sleeve and the spindle, release means for moving said wedge means to an alternative position in which it permits movement of the sleeve with respect to the spindle to enable the hob to be changed, an end cap at the inboard end of the bearing housing having an aperture therethrough for the spindle to enter the bearing housing, a sealing ring in the aperture and surrounding the spindle, a pad slidably fitted within a bore of the wedge means and a spring urging the pad against the end of the spindle so that at all times the bearing housing is sealed against the ingress of foreign matter.

4,015,511
FEEDER

Lawrence R. Folsom, Schenectady, N.Y.; John F. O'Brien, St. Albans, Vt.; Roger E. Gaboriault, Williston, Vt.; August J. Haberstroh, N. Hero, Vt., and Ettore J. Mancuso, Jr., Essex Junction, Vt., assignors to General Electric Company, Burlington, Vt.

Filed Aug. 19, 1974, Ser. No. 498,353
Int. Cl.² F41D *9/02*
U.S. Cl. 89—33 SF **27 Claims**

1. An at least partly self acting gun having a single gun barrel and a single gun bolt and undergoing repeated cycles of operation and firing linked rounds of ammunition comprising:
a housing;
said gun bolt having a bolt face and disposed in said housing and reciprocable along a longitudinal axis to and between a seared station and a chambered station;
said bolt face including a pair of diametrically opposed extractor hooks defining a passageway therebetween for passing the extractor disk of the case of a round of ammunition;
first transfer means disposed in said housing for receiving a first train of linked rounds and for side stripping the leading round from its link in the train;
second transfer means disposed in said housing for receiving a second train of linked rounds and for side stripping the leading round from its link in the train;
third transfer means disposed in said housing for transferring the stripped leading round from said first transfer means to said bolt face when said bolt is at its seared station;
fourth transfer means disposed in said housing or transferring the stripped leading round from said second transfer means to said bolt face when said bolt is at the seared station; and
drive means having a first disposition for driving said first

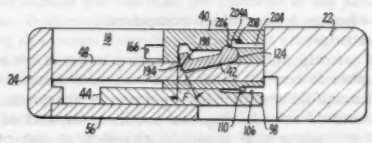


and third transfer means and for locking said second and fourth transfer means, and a second disposition for driving said second and fourth transfer means and for locking said first and third transfer means;
said third and fourth transfer means respectively disposing the extractor disk of the case of a transferred round of ammunition into said passageway defined by said extractor hooks, with said hooks entering the extractor groove of that case.

4,015,512
GAS-OPERATED FIREARM

Jay J. Feerick, 1847 MacArthur Blvd., Oakland, Calif. 94602

Filed Oct. 29, 1974, Ser. No. 518,639
Int. Cl.² F41D *5/04*
U.S. Cl. 89—190 **2 Claims**



1. A firearm, comprising: a receiver defining a cartridge-receiving chamber, said
chamber having an open breech; a bolt for closing said breech; guide ways for carrying said bolt;
a driving spring for driving said bolt along said guide ways to close said breach;
a locking member pivotally mounted in said bolt;
recesses in said guide ways for receiving said locking member to lock said bolt in its breech-closing position;
an operating slide slidably mounted in said receiver for sliding parallel to said bolt;
a gas piston for driving said operating slide rearwardly in said receiver from its pre-firing position whenever a cartridge is detonated in said chamber;
return springs for driving said operating slide forwardly in said receiver past said pre-firing position;
a cam pivotally mounted in said receiver for driving said locking member from said recess when rotated in a first direction by said operating slide; and
a sliding member slidably mounted in said bolt and posi-

tioned to be driven into said bolt by said receiver when said bolt closely approaches said receiver, said sliding member bearing against a surface of said locking member and driving said locking member into its bolt-locking state whenever said locking member is driven into said bolt.

4,015,513
INDEXING DEVICES

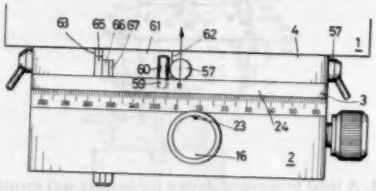
Heins Ditzel, and Werner Ditzel, both of Hainstrasse 27-29, 6369 Schoneck 1, Germany

Division of Ser. No. 628,649, Nov. 4, 1975. This application May 18, 1976, Ser. No. 687,603

Claims priority, application Germany, Nov. 5, 1974, 2452340; May 6, 1975, 2520022

Int. Cl.² B23F *23/08;* **B23B** *5/22*

U.S. Cl. 90—57 **6 Claims**



1. An indexing device comprising first, second and third discs substantially coaxial with one another; first and second engagement means of said first and second discs, respectively, interengageable releasably to latch said first and second discs in any selected relative angular position; said second and third discs having respective abutment surfaces; gage means between said abutment surfaces; so that said second and third discs can be angularly positioned relative to each other by turning said second and third discs relative to each other until said gage means abuts both said abutment surfaces; clamping means including a clamping member movable in an axial direction of said discs to clamp said second and third discs against the relative turning; one of said second and third discs having therein a first radially extending passage; the other of said second and third discs having therein a second passage extending transversely to said first passage and communicating with the latter; said clamping means including a first pin turnably received in said first passage and including an eccentric portion; a second pin received in said second passage; and retaining means of said other disc arranged to engage said second pin to limit movement of the latter lengthwise of said second passage, said eccentric portion so engaging said second pin that, by turning of said first pin, said second pin can be moved lengthwise of said second passage into clamping engagement with said retaining means; wherein an axially outer one of said discs is formed with an axial bore for receiving a tool shank; the indexing device further comprising means for releasably engaging the tool shank when inserted into said bore.

4,015,514
APPARATUS FOR MAKING CIGARETTE FILTERS

Walter A. Nichols, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Jan. 29, 1976, Ser. No. 653,467

Int. Cl.² A24C *5/50*

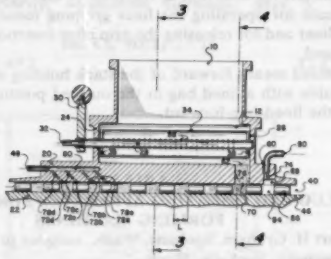
U.S. Cl. 93—1 C **15 Claims**

1. Apparatus for feeding particulate material into spaces between filter plugs secured to a continuous filter wrap comprising:

a. a hopper means for containing said material and having an outlet for discharging said material;

b. fluidizing means having an extent thereof supported in said hopper means in engagement with said material for issuing pressurized air through said material while said material is in said hopper means; and

c. material feed control means having an elongate passage therethrough for conveying said filter wrap therethrough in partially encircling relation to said filter plugs and spaces, said material feed control means including a unitary housing part having first, second and third conduit means therein communicating with said passage at



first, second and third locations respectively successively longitudinally disposed along said passage, said first location being longitudinally spaced from said second location by a distance not less than the longitudinal distance between successive of said filter plugs, said first conduit means being pressurized negatively with respect to said hopper means, said third conduit means being pressurized positively with respect to said first conduit means and negatively with respect to said hopper means, said second conduit means communicating further with said hopper means outlet.

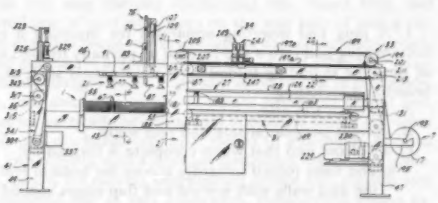
4,015,515
APPARATUS FOR INSERTING LINERS IN BAGS

Harold K. Johnson, Burnsville, Minn., assignor to Bemis Company, Inc., Minneapolis, Minn.

Filed Apr. 16, 1976, Ser. No. 677,786

Int. Cl.² B31B *1/00*

U.S. Cl. 93—8 W **27 Claims**



1. Apparatus for inserting liners in open-mouth bags, each liner being an open-mouth bag having a bottom end closure at the opposite end from the mouth, said apparatus comprising:

means for holding a stack of bags with the bags in the stack extending longitudinally of the apparatus and with the mouths of the bags in the stack directed toward one end of the apparatus constituting its rearward end;

means for gripping the upper wall of the uppermost bag of the stack and raising it to open said bag for insertion of a liner therein;

an inserter movable forward longitudinally of the apparatus from a rearward retracted position wherein its foward end is rearward of the mouth of the opened bag through a forward stroke above said stack holding means for entry of the inserter in the opened bag to insert a liner therein and for movement of said bag with the liner therein to an

outfeed position wherein the forward end portion of the bag is forward of the stack;

said inserter having means for gripping a liner for forward movement of the liner with the inserter into the opened bag;

means for moving the inserter longitudinally of the apparatus through a forward stroke from its retracted position and then through a rearward return stroke back to its retracted position;

means for feeding a liner from a supply thereof to bring the liner into position for being gripped by said liner gripping means for insertion of the liner in said opened bag;

means for operating the liner gripping means to grip said liner and for releasing the grip after insertion of the liner; and

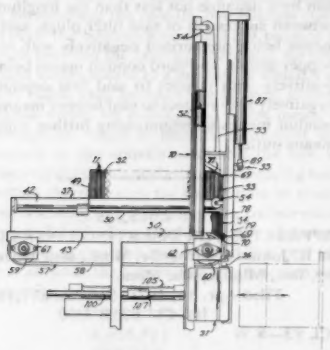
outfeed means forward of the stack holding means engageable with a lined bag in the outfeed position for feeding the lined bag forward.

4,015,516

PLUG PAD INSERTING APPARATUS FOR CARTON FORMING MACHINES

Robert H. Graham, Spokane, Wash., assignor to R. A. Pearson Company, Spokane, Wash.

Filed Feb. 13, 1976, Ser. No. 657,844
Int. Cl.² B31B 7/00
U.S. Cl. 93—36.3 **16 Claims**



1. A plug pad inserting apparatus for inserting a carton bottom plug pad into a pre-formed or partially formed carton of the type including folded semi-rigid panels such as cardboard and including:

A. an open top end;

B. upright peripheral side and end walls;

C. a bottom end that when complete is formed by:

a. end flaps folded inwardly across the bottom end from the end walls with inward end flap edges spaced apart by a prescribed distance;

b. side flaps folded inwardly across the bottom end overlapping the end flaps and including inside edges spaced closely adjacent one another;

c. a recess opening toward the top end and defined by the end flap edges, side walls, and surfaces of the side flaps that face the top end;

wherein the plug pad includes peripheral edges defined by parallel oppositely facing planar side surfaces and is equal in dimension to the recess and

wherein the plug pad inserting apparatus is comprised of:

a supportive framework;

a magazine means for receiving a stack of plug pads, and having an open discharge end for releasing individual pads;

mandrel means for receiving single pads from the magazine means at a mandrel loading station;

pad placing means for feeding successive pads to the mandrel means at the mandrel loading station;

mandrel drive means for moving the mandrel into the open end of a carton to press against the carton bottom; and

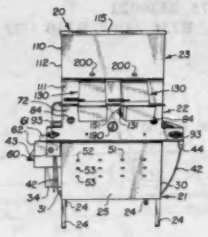
ejection means for removing the single pad from the mandrel and pressing the pad into the recess.

4,015,517

FOOD PROCESSING DEVICE

Johnny B. Pomara, Jr., Dallas, Tex., assignor to El Chico Corporation, Dallas, Tex.

Filed Sept. 10, 1975, Ser. No. 612,171
Int. Cl.² A47J 27/14
U.S. Cl. 99—355 **7 Claims**



1. A food processing device for heating soft tortillas and for heating, storing, and dispensing toasted tortilla chips comprising: a heating means a bottom heating section including housing means defining a bottom heating compartment enclosed around the sides and ends thereof and open at the bottom and top; means secured with said housing defining said bottom compartment for heating the space within said bottom compartment; a middle section connected with said bottom secton defining a middle compartment open at the bottom and top thereof and communicating with said heating means in said bottom section for heating said middle compartment; a conveyor system in said middle section including an upper conveyor belt and a lower conveyor belt, said upper conveyor belt having a lower portion thereof and said lower conveyor belt having an upper portion thereof moving in closely spaced parallel relationship for capturing and transporting through said middle compartment soft tortillas for heating such tortillas and holding said tortillas in substantially flat condition, said upper conveyor belt being shorter than said lower conveyor belt, said upper portion of said lower conveyor belt extending from opposite ends of said middle section providing an input end and a discharge end for said soft tortillas; shelf means secured at said discharge end of said lower conveyor belt below said end of said belt for supporting a container to receive and hold heated soft tortillas discharged from said discharge end of said lower conveyor belt; drive means connected with said upper and lower conveyor belts for driving said belts at substantially equal speeds, an upper housing section secured with said middle housing section in defining an upper compartment for storing, heating and dispensing said toasted tortilla chips, said upper housing section having ends and sides corresponding with ends and sides of said middle housing section; a movable top secured on said upper housing section for movement between an open condition for filling said upper compartment with said tortilla chips and a closed condition for confining heat in said upper compartment; a floor in said upper housing section separating said upper compartment from said middle compartment; dispensing chute means connected with said middle and upper housing sections, said dispensing chute means defining a passage for hot gasses between said middle compartment and said upper compartment around said floor including a first opening from said chute means and said middle compartment and a second opening spaced upwardly from said first opening from said chute means into said upper compartment and including a

door means into said chute means for access into said upper compartment through said upper opening from said chute means into said upper compartment for dispensing said tortilla chips from said upper compartment; and flue means connected into said upper section above and below said floor for venting said middle compartment and said upper compartment to the atmosphere.

4,015,518

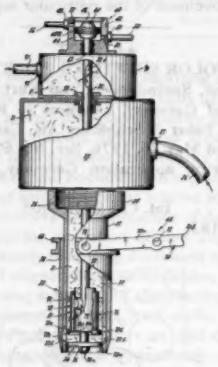
APPARATUS FOR FORMING A VARIETY OF SHAPED BODIES WITH AN INTERNAL FILLING

Howard Roth, Yonkers, N.Y.; Peter R. Baldry, Greenwich, Conn.; Harold B. Kaufman, Jr., New York, N.Y.; John P. McCarthy, College Point, N.Y., and Kurt Wallenfels, Jackson Heights, N.Y., assignors to DCA Food Industries Inc., New York, N.Y.

Filed Mar. 16, 1976, Ser. No. 667,379

Int. Cl.² A21C *9/06*

U.S. Cl. 99—450.6 **25 Claims**



1. An apparatus for simultaneously forming a plastic material and a filling material into shaped bodies, each having an internal filling, said apparatus comprising a forming mechanism including a nozzle body having a plurality of shaped orifices in its periphery for forming said plastic material and defining an outer chamber adapted to be connected in communication with a source of said plastic material, a cutter sleeve mounted on said nozzle body for movement relative thereto, said cutter sleeve being normally disposed to close said plastic material forming orifices and being moveable relative to said nozzle body to selectively cover and uncover said plastic material forming orifices; a filling forming mechanism disposed within said nozzle body and including outer and inner members arranged to define an inner chamber therebetween adapted to be connected in communication with a source of filling material, means mounting said outer and inner members for movement relative to one another, said outer and inner members being normally disposed to retain said filling material in said inner chamber and coacting, when opened, to define an outwardly opening channel confronting said plastic material forming orifices and permitting the exiting of said filling material from said inner chamber, a shell mounted to one of said outer and inner members and arranged to confront said channel, said shell having a plurality of shaped filling material forming orifices therein each being arranged in confronting relation to one of said plastic material forming orifices, said outer and inner members and said shell being constructed and arranged so that the closing and opening of said inner chamber is effective to cover and uncover said filling material forming orifices; and actuating means for said plastic material forming and said filling material forming mechanisms adapted to selectively uncover and cover said plastic and filling material forming orifices in timed relation to one another.

4,015,519

APPARATUS FOR STORING CHEESE LOAVES AND FOR PERIODICALLY TURNING THEM UPSIDE DOWN

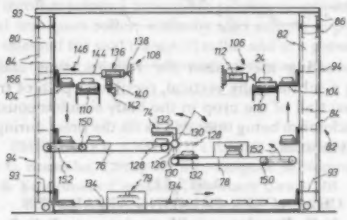
Gerrit Jan van Elten, Barneveld, and Antonius Hurkmans, Baarn, both of Netherlands, assignors to Technisch Ontwikkelingsbureau van Elten B.V., Voorthuizen, Netherlands

Filed Apr. 24, 1975, Ser. No. 571,088

Claims priority, application Germany, May 3, 1974, 2421515

Int. Cl.² A01J *25/16*

U.S. Cl. 99—452 **12 Claims**



1. An apparatus for storing cheese loaves and for periodically turning them upside down, said apparatus comprising an array of adjacent units, each unit constituting a multiplicity of horizontal open-ended guideways in superimposed relationship, each guideway accommodating a multiplicity of adjacent horizontal boards, each board having a width and a length sufficient to support at least one loaf of cheese, the height of each guideway being in excess of the height of each loaf, horizontal supply conveyor means extending transversely to said guideways in front of said array for conveying a loaf-carrying board into registry with a selected one of said guideways, said supply conveyor means having an input end, a pushing device mounted in adjacent relationship to said supply conveyor means for horizontally pushing said board on said conveyor means away from the latter and into said selected guideway a distance corresponding to the width of said board causing the latter to push said multiplicity of adjacent horizontal boards one step thereby discharging one board from said selected one of said guideways on the rear side of said array, horizontal discharge conveyor means extending transversely to said guideways across said rear side of said array for receiving the discharged board from said selected one of said guideways, said discharge conveyor means having an output end, means for vertically adjusting said horizontal supply conveyor means and discharge conveyor means to a common selected level into registry with a selected horizontal row of said guideways, means for moving said pushing device into registry with said selected one of said guideways, transporting means extending adjacent to said array from said output end of said discharge conveyor means to said input end of said supply conveyor means, and overturning means for turning a cheese loaf upside down, said overturning means being included in said transporting means.

4,015,520

STACK-FORMING MACHINE HAVING TILTING PRESS

John Dale Anderson, and Bruce Leo Lutz, both of Box 788, Hesston, Kans. 67062

Filed June 6, 1975, Ser. No. 584,468

Int. Cl.² B30B *1/08*

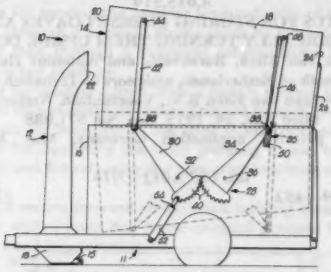
U.S. Cl. 100—215 **11 Claims**

1. A stack-forming machine including:

a container having a crop-receiving body and a vertically reciprocable press for compacting the crop in the body,

said press having a length and width substantially the same as the interior of said body;

a loader for feeding crops into the container; and



press-actuating mechanism for reciprocating said press along a substantially vertical, rectilinear path of travel to compact all of the crop in the body simultaneously,

said mechanism being operable to tilt the press during reciprocation of the latter.

4,015,521

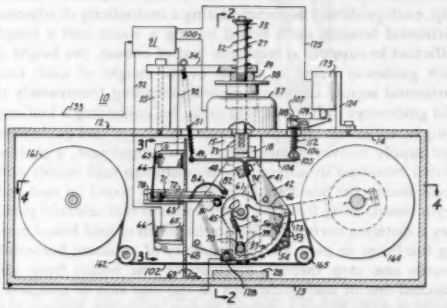
CHARACTER PRINTING APPARATUS

Joseph J. Neff, Pasadena, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Apr. 14, 1975, Ser. No. 567,589

Int. Cl.² B41J 1/44

U.S. Cl. 101—99 **22 Claims**



1. In apparatus for printing characters on a printout surface, the improvement comprising in combination:

a shaft having a longitudinal axis;

a plurality of curved segments mounted side by side on said shaft for individual angular movement about said axis, each of said segments having a series of character types on an outer curved surface and a distinct first surface feature behind each of said character types in an inner curved surface;

means connected to said shaft for mounting said shaft for movement together with said segments toward and away from said printout surface perpendicularly to said axis;

means operatively associated with said segments for selectively positioning said character types adjacent said printout surface, said character type positioning means including means for individually moving said segments angularly relative to said axis and for selectively resetting said segments to a rest position; and

means operatively associated with said segments for selectively moving said shaft and segments toward and away from said printout surface, said segment moving means including a print hammer structure having a second surface feature constructed for simultaneously engaging said angularly moved segments at their first surface features behind the selectively positioned character types, and means coupled to said hammer structure for actuating said print hammer structure toward said angularly moved segments and said printout surface for a printout of said characters on said selectively positioned character types, said first and second surface features being mutually complementary;

said means for individually moving said segments including for each segment an individual actuating rod having a longitudinal axis, means coupled to said actuating rod for selectively moving the actuating rod along said longitudinal axis, means coupled to the particular segment and operatively associated with said actuating rod for translating movement of said actuating rod along said longitudinal axis into angular movement of the particular segment relative to said axis, and means for mounting said actuating rod for angular movement during movement of said segments toward and away from said printout surface; and

said translating means including a ratchet teeth structure for each of said segments, and said means for moving said actuating rod including means for moving said actuating rod into engagement with said ratchet teeth structure for angular movement of the particular segment.

4,015,522

MULTICOLOR SHEET-FED PRINTING PRESS

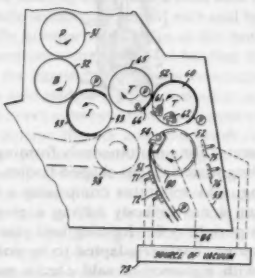
Friedrich Preuss, Sprendlingen, and Kurt Difflipp, Dietzenbach, both of Germany, assignors to Roland Offsetmaschinenfabrik Faber & Schleicher AG, Germany

Filed May 26, 1976, Ser. No. 690,177

Claims priority, application Germany, May 28, 1975, 2523662

Int. Cl.² B41F 7/06

U.S. Cl. 101—183 **10 Claims**

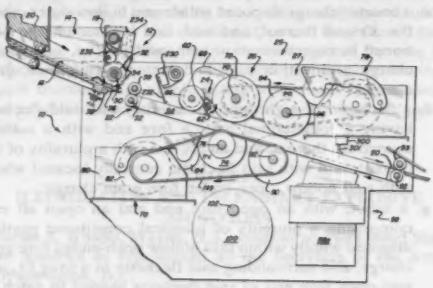


1. In a multicolor sheet fed printing press installation, the combination comprising, a first press unit having means including a first impression cylinder for printing on one side of a sheet, a second press unit having means including a second impression cylinder for printing on one side of a sheet, a conveyor comprising an endless conveyor chain having grippers and trained about an inlet sprocket in the first press unit for taking a sheet from the first impression cylinder and trained about an outlet sprocket in the second press unit for delivering the sheet to the second impression cylinder, first and second transfer drums interposed in series between the outlet sprocket and the second impression cylinder for controlling the feeding of the sheets to the latter, the first transfer drum having (1) means including a normal set of grippers for gripping the leading edge of the sheet at the outlet sprocket for printing on a first side of the sheet in the second press unit, and (2) means including an auxiliary set of grippers for gripping the trailing edge of the sheet at the outlet sprocket and for transferring the gripped edge to the normal set of grippers, thereby to reverse the sheet for printing on the second side of the sheet in the second press unit, and means for receiving sheets from the second impression cylinder and for delivering them at a delivery point.

4,015,523
METHOD AND APPARATUS FOR FEEDING AND PRINTING DOCUMENTS

Robert H. Evans, and Ronald F. Wochinski, both of Palatine, Ill., assignors to AES Technology Systems, Inc., Elk Grove Village, Ill.

Continuation-in-part of Ser. No. 285,608, Sept. 1, 1972, abandoned. This application Jan. 24, 1973, Ser. No. 326,395
Int. Cl.² B41F *13/24*; B65H *7/20*
U.S. Cl. 101—233 **17 Claims**

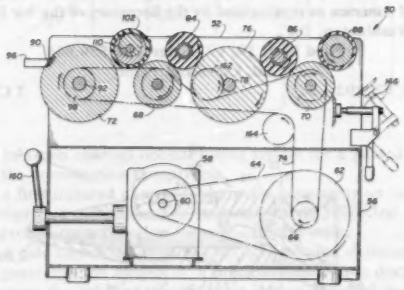


1. A document feeding device comprising selectively actuated feeding means adapted to sequentially deliver documents from a source to a feed path; continuously operating means for moving said documents along said feed path; aligning means along said feed path for temporarily interrupting the movement of each of said documents along said feed path and for aligning each of said documents relative to said feed path; control means responsive to the presence of documents in said feed path for effecting actuation of said aligning means to allow said continuously operating document moving means to move each of said aligned documents further along said feed path and for effecting actuation of said feeding means to feed a subsequent document to said feed path; printing means along said path for printing indicia on said documents, said printing means being disposed downstream of said aligning means; and means for actuating said printing means in response to actuation of said aligning means.

4,015,524
PROOFING PRESS

Lawrence Herbert, New York, N.Y., assignor to Pantone, Inc., Moonachie, N.J.

Filed Sept. 17, 1975, Ser. No. 614,123
Int. Cl.² B41F *13/24*
U.S. Cl. 101—247 **8 Claims**

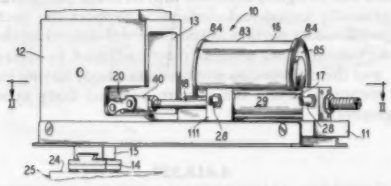


1. For use preparatory to a printing run to be conducted at a selected speed and printing pressure, a proofing press for producing a sample printed at said speed and pressure for checking purposes comprising a variable speed drive operatively arranged to power in rotation at least one driving roller, drive means connected from said driving roller to transmit the rotative movement thereof to a cooperating pair of front and rear driven rollers spaced from each other so as to define an ink film forming station therebetween, plural idler ink film forming rollers operatively arranged to be driven in rotation by said front and rear driven rollers so as to spread an ink supply into a film on the surfaces of each idler roller and on said pair of driven rollers, a substrate sample transport roller spaced from said front driven roller so as to define a sample inking station therebetween, drive means connected from said driving roller to transmit the rotative movement thereof also to said substrate sample transport roller, and an inking roller at said inking station mounted to be pivotally traversable between positions of established pressure contact initially with said front driven roller having said ink film over the surface threof and subsequently with said substrate sample being urged through printing movement relative to said inking roller by said transport roller, whereby said sample is printed at a speed selected for said transport roller and at a pressure corresponding to said established pressure contact therewith.

4,015,525
IMPRINTER AND ACTUATOR THEREFOR

James L. Shenoha, Lockport, Ill., assignor to Norwood Marking & Equipment Company, Downers Grove, Ill.

Filed Apr. 26, 1976, Ser. No. 680,382
Int. Cl.² B41K *1/42*
U.S. Cl. 101—333 **14 Claims**



1. An imprint marker having a frame member, a stationary power cylinder carried by the frame member having a projectable power ram reciprocatable in a first longitudinal plane only, a type bar carrying member having a first end adapted to carry a type bar, a first pivotable member pivotably attached to the frame through a first pivot axis at a right angle to the projection of the power ram, the type bar carrying member pivotably attached to the first pivotable member at a moving second pivot axis parallel to the first pivot axis and spaced therefrom, the second pivot axis positioned intermediate first and second ends of the type bar carrying member, a second end portion of the type bar carrying member pivotable around a frame carried fixed pivot having a third pivot axis parallel to the first and second pivot axes, the connection between the second end portion and the fixed pivot being a lost motion connection, the improvement of a rigid force transmitting connection between the ram and the first pivoting member, said connection having portions thereof pivotable with respect to the ram and frame.

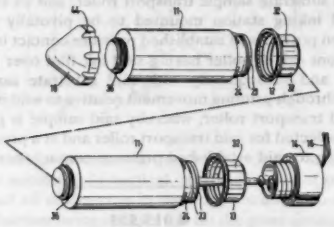
4,015,526
EXPLOSIVE CHARGE

John Alan Bond, Stevenston; George Martin Frazer Cheyne, Troon, both of Scotland, and Adrien Patrick Rayner, Iver, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Apr. 4, 1975, Ser. No. 565,136
Claims priority, application United Kingdom, Apr. 10, 1974, 15803/74; July 25, 1974, 32872/74
Int. Cl.² E21B *43/26*
U.S. Cl. 102—21.6 **19 Claims**

1. A flexible plastics container for an explosive charge for

use under hydrostatic pressure comprising: a body having a closed end wall and at the other end a neck of smaller transverse cross-section than the body, said neck having an open outer end and an inner end joined to the body by at least two shoulder portions, the shoulder portion nearest the neck having a shoulder surface facing generally in the same direction as the open end of the neck and merging with the inner end of the neck and a generally cylindrical surface which merges into a shoulder surface of the adjacent shoulder portion; and a closure cap for sealing the opening at the outer end of said neck, said cap having a circular end wall portion adapted to



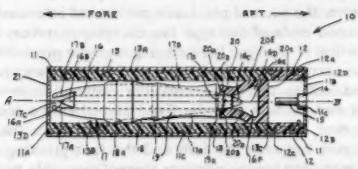
engage the outer end of said neck transversely to provide a leakproof seal and, depending from said circular end wall portion, a continuous central plug adapted to fit closely into the opening and support the neck against internal distortion and an outer annular skirt adapted to fit around the outside of the neck and to tightly embrace with its lower peripheral edge said generally cylindrical surface to support the neck and adjacent shoulder portion against external distortion, the plug and skirt defining an annular recess adapted to receive the neck, and the closure cap and container body having engagement means to retain the closure cap and body in sealing engagement.

4,015,527

CASELESS AMMUNITION ROUND WITH SPIN STABILIZED METAL FLECHETTE AND DISINTEGRATING SABOT

Harold O. Evans, Fort Walton Beach, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 10, 1976, Ser. No. 665,597
Int. Cl.² F42B *5/02*
U.S. Cl. 102—38 **9 Claims**



1. A caseless round, comprising:

a. a cylindrical-configurated hollow outer case having a fore end, an aft end and an internal surface, with said fore end open and said aft end closed, and with said closed aft end having an aperture therein;

b. an aft grain charge shaped in the form of a hollow, open-ended cylinder and having an outer surface, an inner surface, an aft surface and a fore surface, with said aft grain charge disposed wholly within said hollow outer case, and with said outer surface of said aft grain charge abutting with said internal surface of said outer case, and also with said art surface of said aft grain charge abutting with said closed aft end of said outer case;

c. a fore grain charge shaped in the form of a hollow, open-ended cylinder and having an outer surface and an aft surface, with said fore grain charge disposed within said hollow outer case, and with said outer surface of said fore grain charge abutting with said internal surface of said outer case, and also with said aft surface of said fore grain charge abutting with said fore surface of said aft grain charge;

d. a primer charge disposed within said hollow outer case at the aft end thereof, and with said primer charge positioned at said aperture of said outer case aft end and within said hollow, open-ended aft grain charge;

e. a booster charge disposed within said hollow outer case at the aft end thereof, and with said booster charge positioned in communication with, and fore of, said primer charge and within said hollow, open-ended aft grain charge;

f. a flechette of high density material, with said flechette having a longitudinal axis, a fore end with a suitably shaped tip thereat, and an aft end with a plurality of fins thereat, and with said flechette centrally located wholly with said hollow, open-ended fore grain charge;

g. a sabot, with an open fore end and an open aft end, comprising a plurality of identical constituent portions disposed wholly within said hollow open-ended fore grain charge, and surrounding said flechette in a snug fit, with said open fore end of said flechette shaped to catch air and positioned at said open fore end of said sabot, and with said aft end of said flechette protruding from said open aft end of said sabot;

h. a first seal fitted over said sabot and disposed wholly within said hollow open-ended fore grain charge, with said first seal having a rotating band ring external of, abutting with, and integrated with said first seal, and with said rotating band ring abutting with said inner surface of said fore grain charge;

i. a fore boot seal fitted over said open aft end of said sabot, and interposed between, and press fit between, said first seal and said sabot;

j. an aft boot seal having an open fore end with a forwardly disposed air-catching circumferential groove thereat, a closed aft end, and a cavity in communication with said open fore end, with said aft boot seal comprising a plurality of portions loosely fitted around said plurality of fins of said flechette, and with said fins wholly within said aft boot seal cavity, and also with said aft boot seal portions abutting said inner surface of said fore grain charge, thereby releasably uniting said aft boot seal portions;

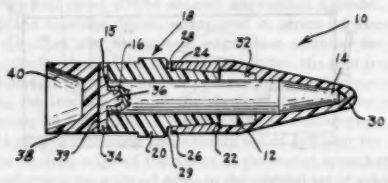
k. and, a second seal disposed at the open fore end of said fore grain charge, thereby closing said end.

4,015,528

HIGH DENSITY ARMOR PIERCING PROJECTILE

Irwin R. Barr, Lutherville, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 19, 1975, Ser. No. 559,860
Int. Cl.² F42B *13/06*
U.S. Cl. 102—52 **7 Claims**



1. A high density armor piercing projectile comprising a high density penetrator core, said penetrator core being of a length substantially greater than the width thereof and being

tapered at one end thereof and having a substantially flat surface at the other end thereof, an indentation being formed within said flat surface of said penetrator core, a carrier body encompassing said penetrator core and having one end thereof located adjacent said flat surface of said core, the other end of said carrier body being of a conical configuration, an enlarged annular segment formed about the midpoint of said carrier body for engaging the barrel bore of a weapon, a stabilizing ring encompassing said conical end of said carrier body and being displaced a predetermined distance from the shoulder of said enlarged annular segment of said carrier body, a lightweight nose being mounted on said tapered end of said penetrator core and abutting at an end thereof said stabilizing ring, a flat pusher plate mounted against the rear flat surface of said penetrator core, said pusher plate having a nipple thereon, said nipple fitting within said indentation in said penetrator body and an obturator mounted on said pusher plate.

4,015,529
ILLUMINATIVE AND INCENDIARY EXPLOSIVE MUNITIONS

Charles A. Knapp, Wayne, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 583,720, June 4, 1975, Pat. No. 3,959,041, which is a continuation of Ser. No. 347,602, April 3, 1973, abandoned. This application Jan. 16, 1976, Ser. No. 649,624

Int. Cl.² F42B *13/14*

U.S. Cl. 102—66 **7 Claims**

1. In a shaped charge, a composition having illuminating and incendiary properties comprising a high explosive and a pyrophoric metal selected from the group consisting of zirconium, titanium and misch metal, wherein said pyrophoric metal possesses a particle size of at least about 1/10 inch and is attached to the shaped charge liner on the side adjacent to said high explosive.

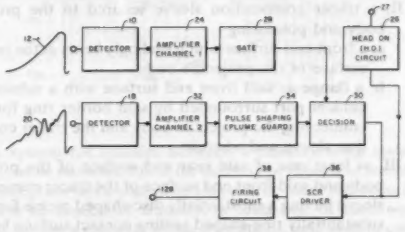
4,015,530
TWO CHANNEL OPTICAL FUZING SYSTEM

John O. Dick, Riverside, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 30, 1966, Ser. No. 540,145

Int. Cl.² F42C *13/04*

U.S. Cl. 102—70.2 P **2 Claims**



1. In a two channel optical fuzing system for a guided missile, the combination comprising:

a. a first infrared energy detector for generating an output signal in proportion to infrared energy detected in a predetermined region forward of the missile,

b. a gate circuit coupled to said first infrared detector for generating an output of a predetermined time duration when the infrared energy is no longer detected by said first infrared energy detector,

c. a second infrared energy detector for generating an output signal in proportion to infrared energy detected in a predetermined region aft of said forward predetermined region,

d. decision circuit means coupled to said gate circuit and to said second infrared energy detector for generating an output pulse when the output signal of said second infrared energy detector is received during the presence of an output gate signal from said gate circuit,

e. a pulse drive circuit coupled to the output of said decision circuit means to provide a low impedance output,

f. circuit means coupled to said pulse drive circuit for initiating an output pulse signal upon the first detection of an infrared source when it is determined that the missile is approaching an infrared source in a head-on direction,

g. a firing circuit coupled to the output of a said pulse drive circuit for generating a low impedance high energy pulse in response to an input pulse from said pulse drive circuit.

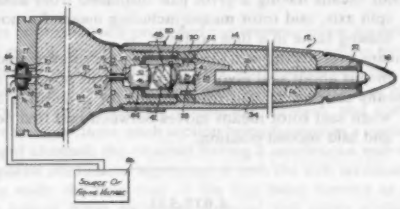
4,015,531
ELECTRICAL FUZE WITH SELECTABLE MODES OF OPERATION

Richard Thomas Ziemba, Burlington, Vt., assignor to General Electric Company, Burlington, Vt.

Filed Jan. 31, 1975, Ser. No. 545,843

Int. Cl.² F42C *11/06*

U.S. Cl. 102—70.2 R **16 Claims**



1. A weapon system comprising:

a source of voltage having first and second output conductors;

a fuze for a round of ammunition, including

first and second input conductors respectively and releasably coupled to said voltage source first and second conductors,

an electrical primer coupled to and across said first and second input conductors, and requiring a first quantity of electrical power for ignition,

a capacitor and unidirectional current flow controlling means coupled in series circuit to and across said first and second input conductors, said controlling means permitting charging of said capacitor from said first and second input conductors and precluding discharging of said capacitor through said first and second conductors,

an electrical detonator and a normally open switch coupled in series circuit to and across said capacitor, said detonator requiring a second quantity of electrical power for ignition which is less than said first quantity of electrical power;

said weapon system having a mode of operation such that

initially said input conductors are coupled to said voltage source conductors, said switch is open, and said capacitor receives and stores a third quantity of electrical power which is equal to or greater than said second quantity of electrical power before said primer receives and is ignited by said first quantity of electrical power, and

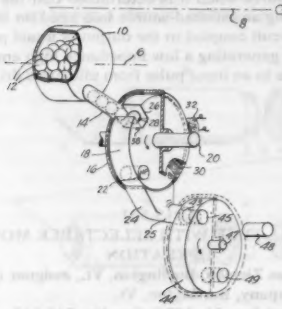
subsequently said input conductors are decoupled from said voltage source conductors, said switch is closed, and said capacitor discharges stored electrical power to said detonator which ignites said detonator.

4,015,532

ENERGY GENERATOR FOR ROTATING PROJECTILES

Warren P. Morrow, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 11, 1976, Ser. No. 657,130
Int. Cl.² F42C 9/00, 15/00
U.S. Cl. 102—70.2 GA 10 Claims



1. Apparatus mounted within a rotating projectile having a main spin axis, which comprises:

rotor means having a pivot axis displaced from said main spin axis, said rotor means including means for normally biasing same in a first position

means overcoming said biasing means for rotating said rotor means about said pivot axis to a second position; and

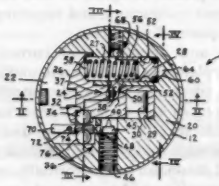
means coupled to said rotor means for generating energy when said rotor means moves between said first position and said second position.

4,015,533

DUAL PRESSURE SENSING SAFING AND ARMING MECHANISM

Ray A. Hermanson, Minneapolis, Minn., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed June 15, 1976, Ser. No. 696,341
Int. Cl.² F42C 5/00
U.S. Cl. 102—81 11 Claims



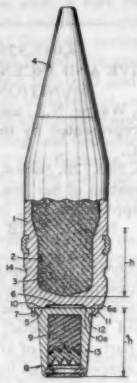
1. A dual pressure sensing safeing and arming mechanism comprising a housing, said housing containing therein a detonator, means for moving said detonator from an inoperable to an operable position, first means for preventing the movement of said detonator moving means, second means for preventing the movement of said detonator moving means, means operably connected to said first movement preventing means for releasing said first movement preventing means upon the application of a first predetermined pressure signal, means operably connected to said second movement preventing means for releasing said second movement preventing means upon the application and subsequent reduction of a second predetermined pressure signal and a firing mechanism in operative relationship with said detonator when said detonator is in the operable position whereby upon the application in a predetermined sequence of said first and second pressure signals, said first movement prevention means is released and said second movement prevention means is released thereby allowing said detonator to be moved to the operative position.

4,015,534

EXPLOSIVE PROJECTILE WITH PROJECTILE BODY

Walter Engel, Dubendorf; Werner Senn, Zurich, and Max Steinemann, Winterthur, all of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Continuation of Ser. No. 533,286, Dec. 16, 1974, abandoned. This application Aug. 16, 1976, Ser. No. 714,920
Int. Cl.² F42B 11/16
U.S. Cl. 102—87 3 Claims



1. An explosive projectile comprising in combination:

I. a projectile body possessing

a. a hollow compartment for receiving an explosive charge,

b. a notch groove for the attachment of a cartridge sleeve at the region of the explosive charge,

c. a rear end surface,

d. a border ring substantially coaxial with the projectile body and extending rearwardly from the rear end surface thereof;

II. a tracer composition sleeve secured to the projectile body and possessing

a. a front end surface which sealingly bears at the rear end surface of the projectile body

b. a flange at said front end surface with a substantially conical part surrounded by said border ring for interconnecting the projectile body and the tracer composition sleeve and wherein

III. at least one of said rear end surface of the projectile body and said front end surface of the tracer composition sleeve having a substantially disc-shaped recess forming a substantially ring-shaped sealing contact surface between such rear and front end surfaces.

4,015,535

HYPERVELOCITY SPALLATORS

John W. Bond, Jr., Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

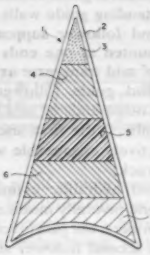
Continuation-in-part of Ser. No. 566,883, April 10, 1975, abandoned. This application Oct. 22, 1976, Ser. No. 734,795
Int. Cl.² F42B 11/26, 13/00
U.S. Cl. 102—92.3 6 Claims

1. A hypervelocity projectile means for producing backface spallation of armor plate, upon impacting said armor plate at

velocities of at least 3 km/sec, to an extent of more than 20 times the mass of the projectile means without penetration of said projectile means through said armor plate comprising:

a. a body having a tip of ablation alleviating material;

b. a secondary tip of high density material located rearwardly adjacent to said tip of ablation alleviating material; and



c. at least two stress wave shaping segments positioned rearwardly of said secondary tip, said wave shaping segments having different impedance factors which increase in value from the frontmost shaping segment to the rearmost shaping segment.

4,015,536

TRANSFER SYSTEM

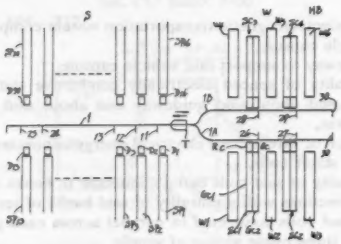
Toshiaki Sato, Amagasaki, Japan, assignor to Unitika Ltd., Japan

Filed Sept. 29, 1975, Ser. No. 617,824

Claims priority, application Japan, Nov. 9, 1974, 49-129201; Nov. 22, 1974, 49-134638; Feb. 8, 1975, 50-16702

Int. Cl.² B61J *3/00*

U.S. Cl. 104—88 **7 Claims**



1. A system for transfer between a delivery work station having one or more locations for delivery of objects of transfer and a reception work station having one or more locations for reception of objects of transfer, at least one of such work stations having a plurality of such locations, said system comprising a guide wire disposed between said stations, said guide wire including sub-wires disposed in rows along said guide wire, a guide truck, and means disposed between one end of each sub-wire and said guide wire for issuing a speed reduction command to said guide truck, said guided truck having guide wire sensors for detecting an electric current in said guide wire, being adapted to perform loading and unloading operations and to depart, stop, travel back and forth and return to its home base in response to signals from said sensors, and a central control unit containing a sequence programmer having output switches for operation and input switches for step-up and adapted to designate a delivery location or reception location in response to a transfer demand signal, issue a materials handling command under control of said sequence programmer in response to control signals including those from detectors associated with said locations, and set or change a section of energization of said wire between said location.

4,015,537

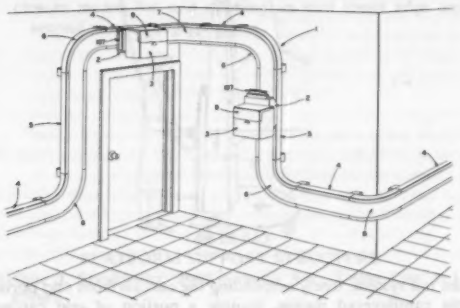
INTERIOR RAILWAY TRANSPORTATION SYSTEM

Harry T. Graef, Dover; Kenneth R. Hansen, Massillon, and Larry A. Morrison, North Canton, all of Ohio, assignors to Diebold, Incorporated, Canton, Ohio

Filed June 9, 1975, Ser. No. 585,025

Int. Cl.² B61B *3/02, 13/00;* **B61C** *11/00, 13/04*

U.S. Cl. 104—91 **27 Claims**



1. In controlled self-propelled car transportation apparatus of the type in which a car travels along a track system having horizontal and vertical track runs with curves between the runs and inside and outside corners between horizontal runs; the track system including connected, straight, and curved corner track sections; each section being formed as a continuous rigid channel; the channel having a continuous web and two spaced continuous legs integral with the web terminating in free ends; the free ends of the legs being formed as rail heads having inner circularly rounded and outer surfaces; opposite rail heads having their rounded surfaces facing each other in spaced relation; means mounting the connected continuous straight, curved and corner track sections to form a track system; and the channel web, when mounted, of each section being oriented vertically throughout the entire track system.

13. In controlled self-propelled car transportation apparatus of the type in which a car travels along a track system having vertical aligned spaced track rail heads formed with convex semicircularly rounded surfaces facing each other in spaced relation; the car including a chassis; a pair of spaced swivel axle means mounted on the chassis; guide rollers journaled on each end of the swivel axle means normally biased axially away from each other; each guide roller being formed with a smooth concave groove continuously semicircularly rounded in cross section; the semicircularly rounded guide roller groove cross section maintaining complete rounded surface engagement with the semicircularly rounded track rail head surfaces at all times during car travel throughout the track system, thereby transmitting the car load to one of the track rail heads directly and uniformly throughout contacting semicircularly rounded guide roll and rail head surfaces.

4,015,538

CARCASS TRANSFER METHOD AND DEVICE

Harry B. Webb; James W. Lee, both of Ocala, Fla., and Robert B. Blair, Guymon, Okla., assignors to Swift and Company Limited, Chicago, Ill.

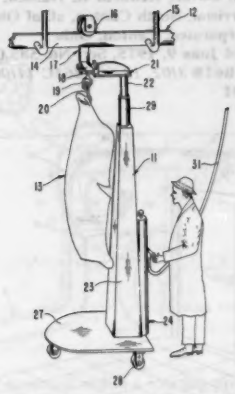
Filed May 27, 1975, Ser. No. 580,904

Int. Cl.² B66B *9/20*

U.S. Cl. 104—97 **5 Claims**

1. A method for transporting animal carcasses suspended from an overhead rail system comprising: activating a lifting means of a portable cantilevered means, upwardly extending

said portable cantilevered means in a substantially vertical sliding direction until it is in approximate mating alignment with a carcass suspending means of an overhead rail system, moving said portable cantilevered means into mating engagement with said carcass suspending means, upwardly actuating said lifting means to free the carcass suspending means from



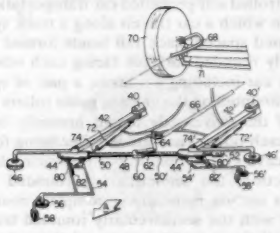
the rail system, freely suspending the carcass from said portable cantilevered means, leaning a portion of said carcass against a generally vertical portion of the cantilevered means to impart added stability to the carcass and to avoid the development of a pendulum effect by said suspended carcass, and transporting said carcass to a desired location.

4,015,539

TRANSPORTATION SYSTEM AND VEHICLES THEREFOR

Mitsuharu Hamada, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Aug. 11, 1975, Ser. No. 603,780
Claims priority, application Japan, Aug. 16, 1974, 49-93965
Int. Cl.² B62D *3/00*
U.S. Cl. 104—130 **11 Claims**



1. A steering system of a vehicle capable of moving along a track including parallelly extending two guide walls at both sides thereof, two guide channels formed on opposite sides thereof, and junctions where two portions of the track join into one portion, and one portion of the track is branched off into two portions, said steering system comprising:

first and second support members secured to the vehicle body;

first and second elongate members pivotally mounted at their one ends on said first and second supporting members, respectively, the elongate members extending generally in the forward direction with respect to the vehicle cruising direction;

a transverse axle pivotally connecting the other ends of said first and second elongate members, the axles being movable in the transverse direction with respect to the vehicle cruising direction in accordance with the pivotal movement of the elongate members;

first and second guide rollers movably connected to said first and second elongate members, respectively, and extending in the opposite transverse directions to each other with respect to the vehicle cruising direction so that the first and second guide rollers are contactable with the parallelly extending guide walls of the track;

first and second follower support members respectively pivotally mounted at one ends thereof on one and the other ends of said transverse axle;

first and second guide followers respectively movably mounted on other ends of said first and second follower support members, the first and second guide followers being respectively engageable with the two guide channels of the track;

first and second hydraulic cylinders respectively having piston rods and pivotally mounted on the first and second elongate members, the piston rods pivotally connected to the first and second follower support members, the hydraulic cylinders being hydraulically connected to a hydraulic control system; and

a linkage mechanically connecting said transverse axle and the steerable wheels of the vehicle so that a transverse movement of the transverse axle is converted into angular movement of the steerable wheels for directional guidance of the vehicle.

4,015,540

ELECTROMAGNETIC TRANSPORTATION SYSTEM

Richard C. Roxberry, Morristown, N.J., assignor to The Port Authority of N.Y. & N.J., New York, N.Y.

Filed May 1, 1975, Ser. No. 573,397
Int. Cl.² B61B *13/08*
U.S. Cl. 104—148 LM **10 Claims**

1. An electromagnetic transportation system comprising:

a vehicle capsule,

a guideway to support said vehicle capsule,

a plurality of spaced electrically conductive stator coils disposed about said guideway and about said capsule therein,

a source of three-phase electrical energy connected across said stator coils,

a plurality of said coils being connected in banks of series connections with a plurality of said banks of series connected coils connected in parallel across each phase of said three phase source of supply,

said capsule comprising a substantially elongated member in an axial direction coextensive with the axial length of said guideway and being constructed of a ferro-magnetic material,

said capsule further comprising spaced segments of non-ferro-magnetic material thereby to increase the efficiency of electromagnetic propagation of said capsule along said guideway,

said capsule including wheel members adapted to roll along a portion of said guideway wherein said capsule is propelled along said guideway by electromagnetic propagation,

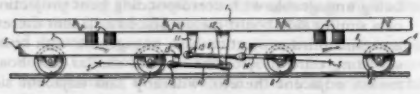
said guideway comprises a channel support member disposed within said stator coils having a peripheral extent less than the internal peripheral extent of said stator coils thereby to support said vehicle capsule and to cooperate with said moving capsule to utilize aerodynamic support effects, and

said stator coils being unconfined about a portion of their peripheral extent to provide for venting of air pressures generated by capsules moving within said coils.

4,015,541
BOGIE DRAFT LINKS

Willi Roosen, Baunatal, Germany, assignor to Rheinstahl AG, Essen, Germany

Filed July 16, 1975, Ser. No. 596,568
Claims priority, application Germany, July 18, 1974, 2434584
Int. Cl.² B61D 1/14, 3/08, 5/20, 5/50
U.S. Cl. 105—199 R 7 Claims

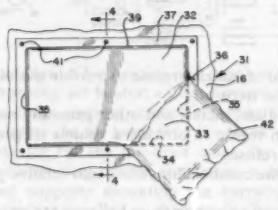


1. In combination with a rail vehicle having a bridge boom and at least two trucks in longitudinally spaced relation therebeneath and each truck pivotal in a horizontal plane and resiliently supporting the bridge boom, and means for transmitting longitudinal forces both under pulling tension and under braking pressure between said bridge boom and said trucks comprising a longitudinal steering bar extending between the bridge boom and each truck respectively, said bars being disposed one above the other and overlapping each other symmetrically as to be positioned in a central vertical longitudinal plane of the bridge boom between both trucks, first swivel means at one end of each bar connecting the respective bar to the bridge boom and in the region of said bridge boom between said trucks, and second swivel means connecting the other ends of said bars to the center of the adjacent end of a respective one of said trucks.

4,015,542
CONVERTIBLE HEADREST FOR SLEEPING CARS

Jack E. Gutridge, Dyer, Ind., and Patricia A. Raidt, Calumet City, Ill., assignors to Pullman Incorporated, Chicago, Ill.

Filed Feb. 17, 1976, Ser. No. 658,196
Int. Cl.² B60N 3/00
U.S. Cl. 105—322 1 Claim



1. In a railway car compartment comprising first, second and third angularly joined upright side walls, a seat within the compartment having a backrest positioned against said second side wall and at one side adjacent to said first side wall, said backrest terminating in a generally horizontal straight upper edge,

a combination pillow and headrest mounted on said second side wall immediately above said backrest upper edge comprising:

a flexible rectangular shaped cover having a front wall and a lower edge portion immediately above said backrest and paralleling the same and having first and second vertical end edge portions and a top edge portion defining corners,

said first vertical end edge portion being located contiguous to said first side wall,

flange means on said cover and extending outwardly from each of said portions for mounting said cover to said second side wall,

means providing an access opening into the cover remote from said first side wall and extending from intermediate the ends of said lower edge portion to said second vertical edge portions around the corner defined thereby and terminating intermediate the ends of said second vertical edge portion,

a pillow conforming to the shape and dimensions of the cover insertable into the cover through said corner opening beneath said front wall and withdrawable with respect to said cover through said opening,

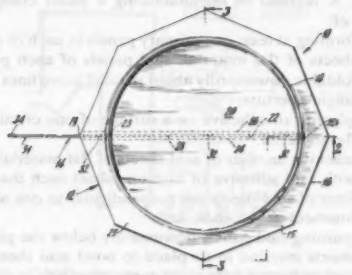
the disposition of said opening in said corner maximizing accessability into the cover for removing and inserting the pillow horizontally from said first vertical edge portion to the second vertical edge portion and from said lower edge portion to the upper edge portion, and

closure means for said opening on said lower edge and second vertical edge portions.

4,015,543
PLATFORM SUPPORT STRUCTURE

Arthur J. Stankowitz, 2905 Summit Ave., Union City, N.J. 07087

Filed Oct. 29, 1974, Ser. No. 519,049
Int. Cl.² A47B 17/00
U.S. Cl. 108—27 5 Claims



1. A platform support structure including in combination:

a platform member having a first and a second substantially parallel opposed surfaces with a predetermined thickness therebetween; said second surface having a narrow elongated slot extending into said platform member a distance equal to at least two thirds of said predetermined thickness; said first surface of said platform structure including a raised wall member extending outwardly from said first surface a distance equal to at least said predetermined thickness, at least a portion of said wall member being arranged vertically above at least a portion of said elongated slot;

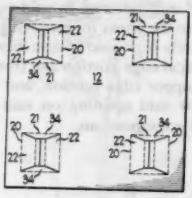
an elongated support member having two opposed longitudinal sides with a narrow lateral support surface extending therebetween, at least a portion of said support surface and the adjacent longitudinal sides of said support member being mounted snugly within said elongated slot; and

two elongated projections extending outwardly from said second surface, one of said elongated projections being arranged respectfully adjacent to at least a portion of each side of said elongated slot and each of said projections including a surface which is contiguous with at least a portion of one of said opposed longitudinal sides of said support member.

4,015,544
DISPOSABLE PALLET

Richard R. Szatkowski, deceased, late of Westmont, Ill. (Richard X. Szatkowski, administrator), assignor to Richard X. Szatkowski

Filed Apr. 24, 1975, Ser. No. 571,061
Int. Cl.² B65D 19/34
U.S. Cl. 108—51.3 13 Claims



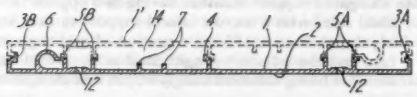
1. A pallet comprising:
a. at least two sheets of flat material bonded together to form a loading deck and supporting legs;
b. each of said legs comprising two primary panels formed in each sheet and folded downwardly to define a square aperture in said deck, said panels of each sheet being folded about parallel hinge lines, the hinge lines of the panels of one sheet being perpendicular to those of the other; and
c. said primary panels having extensions at their bottom edge which are folded parallel to said deck, said extensions overlapping and being bonded together in the area of said overlap.

11. A method of manufacturing a pallet comprising the steps of:
a. forming at least two primary panels in each of at least two sheets of flat material, said panels of each pallet being foldable downwardly about parallel score lines to define a single aperture;
b. placing an adhesive on a surface of one of said sheets of flat material;
c. stacking another of said sheets of flat material in contact with said adhesive of said one sheet such that the score lines of said sheets are perpendicular to one another and intersect at the ends; and
d. pushing said panels downwardly below the plane of said sheets inserted in its place to bond said sheets together and to form a four-sided supporting leg.

4,015,545
SHELF ASSEMBLY

Masayuki Kurokawa, Tokyo, Japan, assignor to Nittetsu Curtainwall Corporation, Tokyo, Japan, a part interest

Filed July 24, 1975, Ser. No. 598,693
Claims priority, application Japan, July 25, 1974, 49-87691[U]
Int. Cl.² A47S 47/04
U.S. Cl. 108—107 5 Claims

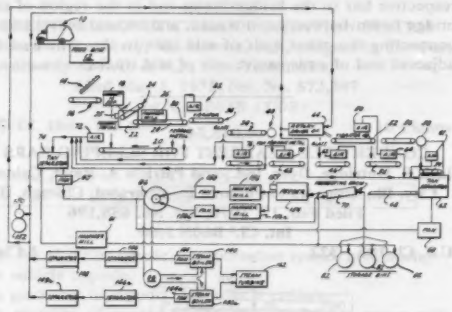


1. A shelving assembly comprising:
shelf board means for supporting articles thereon; and
a plurality of side board means on two sides of said shelf board means for supporting said shelf board means, each side board means having:
an inner flat side adjacent said shelf board, and
an outer side opposite said inner side, said outer side having:
bent first projections having crank-like cross-sections at both ends of the sides of said side board means,
a bent second projection having a crank-like cross-section at the center of said outer side,
a plurality of third spacer projections symmetrically arranged on both sides of said second projection, said first, second and third projections being substantially the same height, said first and second bent projections being engageable with corresponding bent projections of a similar side board means placed adjacent thereto, and said third projection also engageable with corresponding third projections on said similar side board means adjacent thereto, whereby said adjacent side board means are spaced from each other by said projections, and
a tubular portion formed on said outer side of said side board means.

4,015,546
APPARATUS AND METHOD FOR CONVERTING REFUSE TO USEFUL ENERGY

Eugene H. Paules, 854 W. Broadway, Red Lion, Pa. 17356

Filed Oct. 9, 1975, Ser. No. 620,962
Int. Cl.² F23G 5/04
U.S. Cl. 110—8 A 39 Claims



1. A method of utilizing refuse to provide useful heat energy comprising the steps of:
separating glass, metals and other generally non-combustibles from refuse to provide a volume of generally combustible refuse;
shredding the combustible refuse into relatively small particles;
injecting a mixture of primary combustible air and the small particles of combustible refuse into a combustion chamber having a predetermined temperature and simultaneously separating the particles and imparting a cyclonic motion to the mixture whereby the particles ignite and are converted to combustion gases flowing through the combustion chamber;
determining the temperature in said combustion chamber and controlling the flow of secondary combustion air to said combustion chamber in accordance with temperature changes therein to provide maximum combustion temperatures and substantially complete combustion of the particles and resultant combustion gases; and,
maintaining a constant negative pressure in said combustion chamber to control the flow of the particles and gases whereby combustion gases are discharged from said combustion chamber.

16. A system for utilizing refuse to provide useful heat energy comprising:
separating means for separating glass, metals and other generally non-combustibles from said refuse to provide a volume of generally combustible refuse;

shredding means for shredding the generally combustible refuse into relatively small particles;

incinerator means to which a mixture of said particles of refuse and air is fed, said incinerator means including a generally cylindrical combustion chamber and a tangentially disposed separating nozzle through which said mixture is fed whereby said particles are separated and mixed with said air and whereby said mixture enters said combustion chamber with a cyclonic motion;

control means associated with said combustion chamber for maintaining the combustion temperature of the burning mixture in said chamber at its maximum,

said control means including means for changing the amount of secondary combustion air fed to said combustion chamber in accordance with temperature changes therein; and,

blower means for controlling the flow of said burning mixture such that combustion gases are discharged from said combustion chamber.

4,015,547

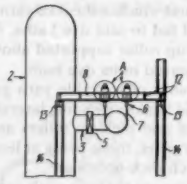
SUPPORTING DEVICE FOR BLAST-FURNACE HOT-BLAST MAIN

Viktor Yakovlevich Miller, Perekopskaya ulitsa, 11, korpus 4, kv. 41; Gennady Petrovich Kandakov, Sevastopolsky prospekt, 51, korpus, 2, kv. 163, and Alexandra Moiseevna Kuznetsova, Meierovsky proezd, 1/1, korpus 1, kv. 100, all of Moscow, U.S.S.R.

Continuation of Ser. No. 564,049, April 1, 1975, abandoned. This application Mar. 10, 1976, Ser. No. 665,416

Int. Cl.² F23L *15/00*; F28F *9/00*

U.S. Cl. 110—56 **3 Claims**



1. In an installation for heating and supplying air to a blast furnace comprising: air heater; a blast-furnace hot-blast main comprising a trunk section; connecting pipes rigidly and airtightly connecting the air heaters to the trunk section; and a supporting device for the hot-blast main; the improvement wherein the supporting device comprises; a carrying beam; self-contained supports mounting the carrying beam; pre-compressed springs installed on the carrying beam; hangers of the hot-blast main secured on the carrying beam through the springs; the pre-compression force in the springs being substantially equal to the mass of the section of the hot-blast main supported by the hangers and the magnitude of the pre-compressed setting of the springs being several times larger than the maximum possible displacement of the connecting pipes when the air heaters are vertically displaced during their operation.

4,015,548

DISTRIBUTED PROGRAMMABLE CONTROL SYSTEM

Jack A. Schuss, West Hartford, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed June 25, 1975, Ser. No. 590,389

Int. Cl.² F23K *3/00*; F23N *1/00*

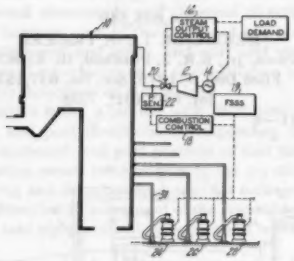
U.S. Cl. 110—101 C **5 Claims**

1. A sub-routine control system for use with a fuel consuming apparatus, the apparatus including a plurality of similar groups of ancillary equipment which contribute to overall system operation, the apparatus further including sensors which provide signals commensurate with conditions which influence safety of operation, each ancillary equipment group being provided with a plurality of sensors for monitoring operating parameters and generating signals commensurate therewith, said control system comprising:

a first programmable controller, said first programmable controller being connected to receive signals commensurate with the operational status of said ancillary equipment groups, said first programmable controller generating command signals for said equipment groups in response to said operational status signals and in accordance with stored instructions whereby said equipment groups will be operated in accordance with a schedule, said first programmable controller also being connected to receive the signals commensurate with the sensed conditions which influence the safety of operation of the apparatus and generating a shut-down signal for the apparatus when said safety signals indicate that an unsafe operating regime is being approached;

a second programmable controller, said second programmable controller being connected to receive the signals commensurate with sensed conditions which influence the safety of operation of the apparatus and generating a shut-down signal for the apparatus when said safety signals indicate that an unsafe operating regime is being approached;

means delivering the signals commensurate with sensed operating conditions which influence the safety of operation of the apparatus to said first and second programmable controllers;



a plurality of third programmable controllers corresponding in number to the number of similar ancillary equipment groups;

means delivering signals commensurate with the monitored operating parameters of each ancillary equipment group to respective of said programmable controllers of said third plurality;

means delivering said command signals from said first programmable controller to said programmable controllers of said third plurality, said controllers of said third plurality of each generating operational status and control signals for its associated equipment group in response to the operating parameter signals and to an input command signal in accordance with stored instructions;

means for delivering the signals commensurate with those monitored operating parameters which relate to the safety of operation of each equipment group to its associated controller of said third plurality, said controllers of said third plurality each generating operation termination signals commensurate with actual and potential violation of safe operating conditions of the ancillary equipment group in response to said safety related operating parameter signals and in accordance with stored instructions;

means for delivering the signals commensurate with those monitored operating parameters which relate to the safety of operation of another ancillary equipment group of each of said programmable controllers of said third

plurality, said controllers of said third plurality each also generating operation termination signals commensurate with actual and potential violation of safe operating conditions of a second ancillary equipment group in response to said safety related operating parameter signals and in accordance with stored instructions, said delivering means insuring that the safety of operation of each ancillary equipment group is redundantly checked by a pair of programmable controllers of said third plurality;

means for comparing the operation termination signals pertaining to each ancillary equipment group as generated by a pair of programmable controllers of said third plurality, said comparing means providing an indication of any discrepancy between the signals commensurate with actual and potential violation of safe operating conditions for an individual equipment group; and

means delivering the operational status signals generated by said programmable controllers of said third plurality to said first programmable controller.

4,015,549

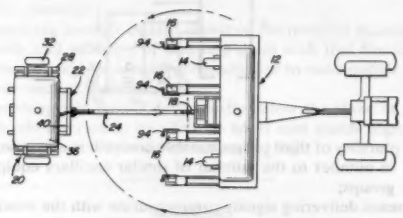
HERBICIDE TANK TRAILER

Owen J. Brown, Jr., R.R. 2, Pittsfield, Ill. 62363

Filed Dec. 3, 1975, Ser. No. 637,153

Int. Cl.² A01C *7/08*

U.S. Cl. 111—8 **4 Claims**



1. In combination with a farm draft vehicle and a wide multi-row ground wheel supported trailer-type planter coupled behind said draft vehicle and including a central frame portion and transversely spaced trailing press wheels disposed rearwardly of said central frame portion, a liquid tank trailer including ground engaging support wheels and a low main frame from which said wheels are supported, a large capacity liquid tank supported from said frame, said trailer including a forwardly projecting towing tongue having a low forward end portion and an elevated elongated front-to-rear extending portion disposed to the rear of said forward end portion, upstanding means connecting the front end of said front-to-rear extending portion to said low forward end portion, means connecting the rear end of said front-to-rear extending portion to said trailer main frame, the effective horizontal distance between said main frame and said low forward end portion of said trailer tongue being greater than the distance from said central frame portion to either outer side of said planter, said low forward end portion being coupled to said central frame portion at a point spaced forward of said press wheels and rearward of the ground wheels of the planter.

4,015,550

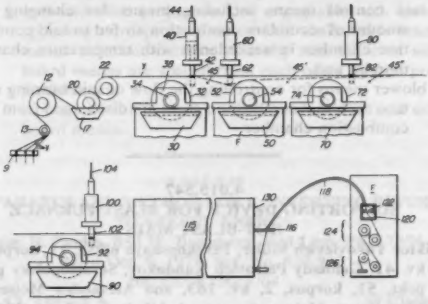
APPARATUS AND METHOD FOR SELECTIVE MULTI-COLOR DYEING OF INDIVIDUAL YARNS AND PRODUCING THEREFROM A PREDETERMINED COMPLEX DESIGN IN A TUFTED CARPET

William Chelsea Bartenfeld; Clifford Aldene Bryant, and Wilbur Koontz Newman, Sr., all of Dalton, Ga., assignors to West Point Pepperell, Inc., West Point, Ga.

Filed Aug. 12, 1975, Ser. No. 603,930

Int. Cl.² D05C *15/26*

U.S. Cl. 112—79 A **34 Claims**



1. Apparatus for dyeing yarn ends individually at predetermined positions along their lengths and manufacturing tufted carpets therefrom to produce a predetermined multi-colored complex pattern therein, the dyeing apparatus comprising

a series of troughs containing different dye baths,

a draw roll around which a sheet of yarn ends from a supply is trained and fed to said dye baths,

a rotating pick-up roller supported above each trough and partially immersed in its dye bath,

a plurality of banks of movable yarn guides for individual yarn ends, said banks extending laterally in planes parallel to the axes of said pick-up rollers and supported above said pick-up rollers, there being at least one bank of yarn guides for each pick-up roller,

pattern control means to move each yarn guide individually to cause yarn carried by it to engage a pick-up roller while a predetermined length of yarn passes,

a drying chamber through which the sheet of yarns passes subsequent to the last dye bath,

a tufting machine having needles in which the individual yarn ends are threaded, and by which the yarn ends are needled through a backing sheet to reproduce the desired pattern,

said tufting machine having at least one pair of cooperating feed rolls,

and means to drive said tufting machine feed rolls and said draw roll in synchronism.

4,015,551

TUFTING NEEDLE

Sheldon M. Jeter, Carlisle, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

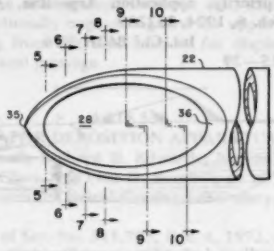
Filed Mar. 29, 1976, Ser. No. 671,248

Int. Cl.² D05B *85/10*

U.S. Cl. 112—222 **2 Claims**

1. A tufting needle comprising a cylindrical shank provided with a cylindrical axial yarn passageway, and means to admit air to said passageway, and means to admit air to said passageway to blow yarn therethrough, said shank being beveled at its lower end, said passageway having a yarn inlet opening at one end and an inclined elliptical shaped yarn discharge opening at its other end defined by the beveled lower end of said shank, said elliptical shaped yarn discharge opening being in axial alignment with said passageway, said beveled lower end

of said shank being arcuate in cross section and having a taper extending convexly inwardly, said taper merging smoothly with the remainder of said shank as a circumferential line being ground from the beveled lower end towards the shank with successively larger radii to around said shank near the



upper periphery of said elliptical opening so that the length of the taper is greatest on the side of the shank which defines the lower periphery of said elliptical opening and progressively decreases around the shank in both directions from said side, to provide a pointed beveled lower end and a gradual rounded curvature towards the shank.

4,015,552

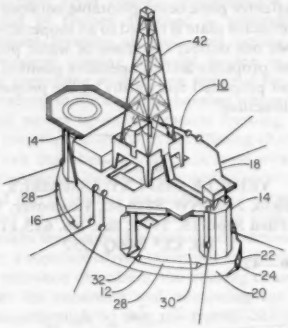
SEMI-SUBMERSIBLE DRILL BARGE

Mehmet D. Korkut, 3848 Veterans Blvd., Metairie, La. 70002

Filed Aug. 25, 1975, Ser. No. 607,856

Int. Cl.² B63B *35/44*

U.S. Cl. 114—265 **5 Claims**



1. An improved semi-submersible drill barge comprising:

a. a double-ended closed hull defining a center opening and having convex sides tapering fore and aft from a maximum beam amidships to sharp oppositely-disposed ends for reducing flat plate resistance ad increasing stability of hull;

b. two end columns mounted, respectively freestanding, on said respective hull ends to extend respectively upwardly therefrom, said columns being convexly structured for reducing resistance to wind and water;

c. two beam columns mounted, respectively freestanding, amidships and spaced transversely apart on said hull with the outboard sides of said columns being conformed to and in continuation of said convex sides of said hull for reducing resistance to wind and wave; and

d. a work deck mounted on said end and beam columns and defining an aperture in vertical alignment with the center opening of said hull, said work deck mounting a drill rig over said aligned center opening and aperture.

4,015,553

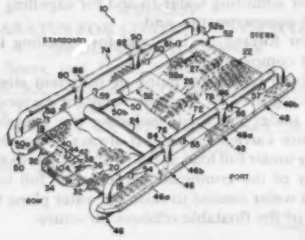
SUBMERSIBLE BARGE CONTROL SYSTEM

Frederic H. Middleton, Madison, Wis., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 18, 1975, Ser. No. 605,572

Int. Cl.² B63G *8/00, 8/26*

U.S. Cl. 114—16 E **10 Claims**



1. A control system for a submersible barge which has starboard bow, port bow, starboard stern, and port stern quadrants, said control system comprising:

said barge having starboard and port pontoons which are each divided into forward and aft ballast tanks;

ballasting and deballasting means for selectively flooding or blowing each of said ballast tanks so as to move any of the barge quadrants in a downward or an upward inclination;

means, including a pair of joy sticks, for selectively actuating the ballasting and deballasting means;

said joy sticks each having bow, stern, starboard and port directional movements and diagonal directional movements between each of the starboard and bow, port and bow, starboard and stern, and port and stern pairs of directional movements so as to constitute a total of eight available directions of movements;

the joy sticks being mounted with their bow, stern, starboard, and port directions corresponding to the bow, stern, starboard, and port portions of said barge;

the actuating means interconnecting the joy sticks with the ballasting and deballasting means for inclining the barge in the direction of movement of the respective joy stick in any of said eight available directions of movement.

4,015,554

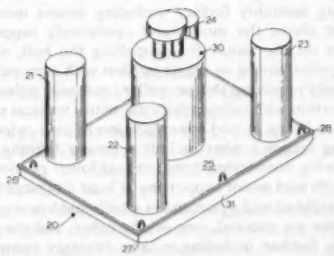
CONSTRUCTION AND LAUNCH BARGE AND METHOD OF PRODUCING AND INSTALLING OFFSHORE STRUCTURES

Philip Y. Chow, Orinda, Calif., assignor to Lin Offshore Engineering, Inc., San Francisco, Calif.

Filed May 2, 1975, Ser. No. 574,110

Int. Cl.² B63B *9/00*

U.S. Cl. 114—65 R **6 Claims**



1. A construction and launch barge, including in combination:

a barge hull of shallow draft,

a construction deck supported by said hull for support of a floatable offshore structure at the center thereof during construction and during towing of said barge to an offshore site,

four hollow buoyant column stabilizers, one located adjacent to each corner of said barge, detachably secured thereto and attached thereto by cable means, and connected together in pairs by struts,

ballast compartments below deck,

means for admitting water to and for expelling it from said ballast compartments, and

means for forcing air into and for expelling it from said ballast compartments,

said column stabilizers being of sufficient size and water displacing area so that the resultant metacenter of the barge under full load, including the floatable offshore structure carried thereby, is always above the center of gravity under full load and also always above the center of gravity of the combined barge under full load and the ballast water needed to raise the water plane to the water plane of the floatable offshore structure.

4,015,555

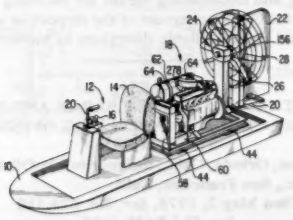
AIR BOAT

Sherman L. Tinkham, 1406 E. Lotus Path, Clearwater, Fla. 33516

Continuation of Ser. No. 347,865, April 4, 1973, abandoned. This application Nov. 29, 1974, Ser. No. 528,262

Int. Cl.² B60F *3/00*

U.S. Cl. 115—1 C **32 Claims**



1. An air boat comprising, an air boat hull, a hull propelling assembly including a motor and an aerodynamic propeller, the propelling assembly further including means mounting the propeller above the motor and operatively supporting the propeller on the motor for propelling the hull, said means being a pylon having an upper portion with a propeller mount operatively receiving the propeller, and said pylon having a lower portion with substantially the entire vertical support for said pylon being at said lower portion of said pylon, and the mounting means further including means defining a vertical load bearing connection between said lower portion and said motor with said motor supporting at least a substantial portion of the weight of said pylon and in which said lower portion and said motor are secured, one on the other, and the propelling assembly further including means drivingly connecting the propeller mount and the motor for operating the propeller, responsive to operation of the motor, to propell the air boat hull, and means mounting the propelling assembly on the hull with the propeller mount above the motor.

4,015,556

DEVICE FOR PROPELLING BOATS

Alejandro Lorenzo Carlos Bordiga, Avenida San Martin 4180, Buenos Aires, Argentina

Continuation of Ser. No. 476,034, June 3, 1974, abandoned. This application Mar. 26, 1976, Ser. No. 670,971

Claims priority, application Argentina, June 4, 1973, 248381; Feb. 6, 1974, 252209

Int. Cl.² B63H *5/16*

U.S. Cl. 115—39 **5 Claims**

1. A propelling device for a propeller-driven boat having a hull with a stern transom and provided with a longitudinally-extending channel at the aft portion of the hull, said channel being open at the rear extremity thereof at said stern transom and along its entire length for flow of water therethrough, a propeller disposed in entirety in said channel adjacent said stern transom for rotation coaxially in said channel at a level above the keel of the boat, a pair of parallel vertical axles supported in spaced relation rearwardly of the stern transom, a pair of deflector fins carried by said axles for rotation about vertical axes passing through said axles, said fins being mounted rearwardly of the propeller, control rods connected to the fins, a connecting rod joining said control rods and being operative therewith to keep said fins parallel to one another while permitting conjoint parallel movement thereof under the action of a steering force applied to said connecting rod, and a curved deflector plate supported for pivotable movement about a horizontal axis disposed rearwardly of said stern transom between said vertical axles and said stern transom, said deflector plate being pivotable between a position in which the deflector plate is raised to an inoperative position in which it does not deflect the mass of water propelled rearwardly by the propeller and an operative position in which the mass of water propelled rearwardly by the propeller is caused to reverse direction.

4,015,557

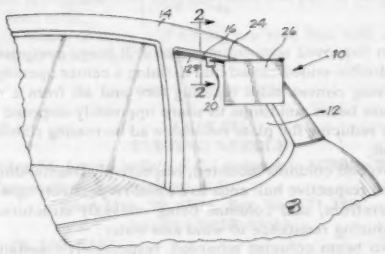
VEHICLE DISPLAY ASSEMBLY

Joseph Schulein, 2405 NW. 88th St., Vancouver, Wash. 98665

Filed Sept. 15, 1975, Ser. No. 613,118

Int. Cl.² B60Q *1/52*

U.S. Cl. 116—42 **6 Claims**



1. A removable display assembly for use on a vehicle arranged to communicate a visual message to oncoming and upcoming vehicular traffic comprising:

carrying means including a clip having laterally opposed side members joined by an interconnecting portion, said portion positionable over the upper margin of a side window such that said side members are disposed on

opposite sides of the window, said clip also including at least one aperture; and

elongate rod means insertable through said aperture for permitting the upper margin of a substantially rolled up side window to press against said rod means such that said connecting portion will be urged upwardly for contact against the side window's uppwer rest, said rod means being frictionally engaged against the upper margin and extending from the side window for displaying an attached visual message.

4,015,558

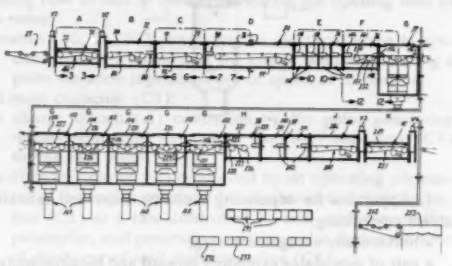
VAPOR DEPOSITION APPARATUS

Edward A. Small; Richard H. Edwards; Eugene A. Eufusia; Robert M. Clary, and Nils H. Bergfelt, all of Santa Rosa, Calif., assignors to Optical Coating Laboratory, Inc., Santa Rosa, Calif.

Continuation of Ser. No. 311,783, Dec. 4, 1972, abandoned. This application May 5, 1975, Ser. No. 574,300

Int. Cl.² C23C *13/10*

U.S. Cl. 118—6 **14 Claims**



1. In a multiple layer coating apparatus for coating substrates carried by frames disposed in generally horizontal positions, means forming at least one coating chamber, a vertically disposed coating material source in the coating chamber for vaporizing at least one material for carrying out coating operations in the coating chamber whereby the vaporized material moves upwardly, means forming an entrance chamber in communication with the coating chamber, means forming an exit chamber in communication with the coating chamber, valve means disposed at opposite ends of each of the entrance and exit chambers for sealing said entrance and exit chambers and interrupting communication with said coating chamber, means for creating a vacuum condition in the coating chamber, a separate driven conveyor assembly provided in each of the entrance chambers, the coating chamber and the exit chamber for receiving and advancing the frames and substrates therethrough so that the frames carrying the substrates and the substrates are maintained in a generally horizontal position in at least the coating chamber with the bottom sides of the substrates being exposed to the vapor stream from the source, said driven conveyor assembly in the coating chamber having a horizontal supporting surface upon which said frames are adapted to rest during travel through the coating chamber, said separate driven conveyor in said coating chamber being driven at a substantially uniform slow speed, said valve means being movable to open positions to permit said frames to pass therethrough, said separate driven conveyor assemblies in said entrance chamber and said exit chamber being capable of being driven at a fast speed in comparison to said slow speed and frame spacing means including means having a plurality of sensing elements in excess of two adapted to be actuated by the frames for sensing the spacing between frames for controlling the operation of the conveyor assemblies whereby a frame is moved rapidly out of the entrance chamber toward the coating chamber until a predetermined spacing exists between it and the preceding frame for maintaining a predetermined minimum spacing between the frames during their travel through the coating chamber.

4,015,559

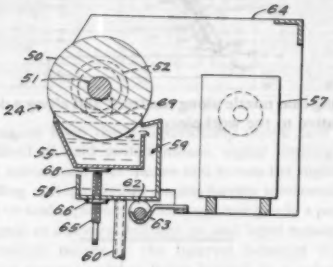
APPARATUS FOR COATING CONTINUOUSLY PRODUCED FILAMENTS

James H. Sears, and James Newton Holloway, Jr., both of Anderson, S.C., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Jan. 13, 1975, Ser. No. 540,738

Int. Cl.² B05C *1/08*

U.S. Cl. 118—259 **10 Claims**



1. Apparatus for applying liquid to filaments comprising:

an open topped container for holding liquid to be applied to filament the sidewall of the container on the side of filament travel defining an upper edge at the opening of the container;

a rotatable mounted applicator member positioned proximate the opening to transfer liquid from the container to filaments passed across the member, the member being mounted with its surface in immediately adjacent spaced apart relationship to the upper edge of the open topped container on the side of filament travel, and,

a screw having one end in contact with the container, the screw adapted to position the container with respect to the member so as to modify the spaced relationship between the upper edge of the container and the surface of the member to keep a sufficiently close spaced apart relationship to restrict air flow into the container from air movement caused by filament travel.

4,015,560

APPLICATION OF GASKET-FORMING MATERIAL TO WORKPIECES

William A. Paul, 1808 Parkside Blvd., Toledo, Ohio 43607

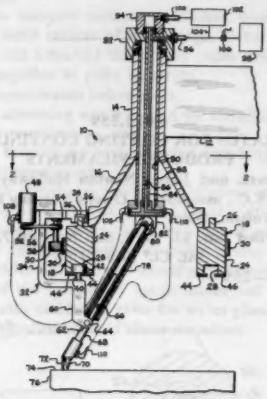
Filed Jan. 12, 1976, Ser. No. 648,394

Int. Cl.² B05C *5/02*

U.S. Cl. 118—323 **14 Claims**

1. Apparatus for applying a bead of gasket-forming material along a mateable surface of a workpiece, said apparatus comprising a track located in a predetermined position relative to the mateable surface of the workpiece, said track having a shape generally the same as the shape desired for the bead to be applied to the mateable surface of the workpiece, a gasket-forming material nozzle carried by said track and directed

toward the mateable surface of the workpiece, means for supplying gasket-forming material to said nozzle, and means



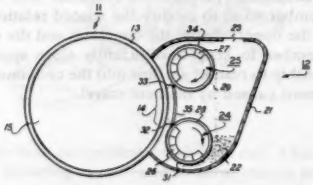
for moving said nozzle along the track and along a determined path relative to the workpiece.

4,015,561

ANTI-GRAVITATIONAL CASCADE DEVELOPMENT FOR ELECTROSTATIC PROCESSORS

Willard L. Howard, Marion, and Ryland F. Rogers, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 12, 1974, Ser. No. 532,084
Int. Cl.² G03G *13/09*
U.S. Cl. 118—654 **11 Claims**



1. A development system for developing latent electrostatic images carried by an image bearing member with developer including toner particles and ferromagnetic carrier particles as said member moves through a substantially magnetic field free development zone having an upper side and a lower side; said system comprising the combination of

a sump for storing a supply of said multi-component developer,

first magnetic means positioned between said sump and the lower side of said development zone for feeding developer from said sump and propelling said developer upwardly into and through said development zone, and

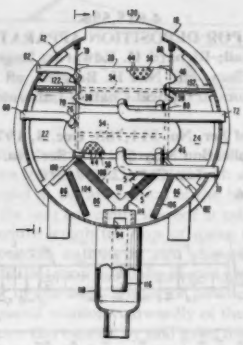
second magnetic means positioned between said sump and the upper side of said development zone for capturing excess developer emerging from said development zone and returning said excess developer to said sump.

4,015,562

MOISTURE SEPARATOR AND REHEATER

Hrant Harry Yousoufian, Montclair, N.J., assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed July 25, 1975, Ser. No. 599,214
Int. Cl.² F22G *1/00*
U.S. Cl. 122—483 **6 Claims**



1. Apparatus for separating moisture from and reheating steam comprising:

a horizontally elongated casing;

a pair of side plates extending upward and longitudinally in said casing;

a bundle of tubes between said plates for flowing heating vapor;

a steam inlet at one end of said apparatus;

a steam outlet through said shell above and between said pair of side plates;

a steam baffle bridging said plates adjacent to said steam inlet so that steam coming in through said steam inlet will impinge against said baffle to separate into two streams, each of said streams flowing between one of said side plates and said casing;

a plurality of first vanes parallel to each other and a plane perpendicular to the longitudinal axis of said apparatus, each of said vanes extending downward from said side plates;

a pair of zig-zag moisture separators below said bundle of tubes, said separators each extending downward and inward from said side plates;

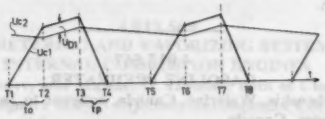
a plurality of second vanes, parallel to each other and the longitudinal axis of said apparatus, said second vanes being positioned between said moisture separators and said first vanes so that steam from said streams will be deflected inward and downward by said first vanes and then upward and inward by said second vanes to approach said separators at an angle substantially perpendicular to said separators and then flow up across said tubes and out of said apparatus through said vapor outlet, each of said second vanes being curved over its width to substantially conform to the path said stream takes while travelling between said second vanes; and

a pair of top plates, each of said top plates extending between one of said side plates and said shell to define the top of one of said streams, each of said top plates being inclined downward away from said steam inlet so that the steam flowing in said streams will move at a substantially uniform velocity.

4,015,563
STABILIZED FUEL INJECTION SYSTEM

Ulrich Drews, Vaihingen-Pulverdingen; Lothar Winkelmann, Ludwigsburg, and Peter Werner, Stuttgart, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Aug. 27, 1975, Ser. No. 608,211
Claims priority, application Germany, Sept. 23, 1974, 2445317
Int. Cl.² F02B 3/00
U.S. Cl. 123—32 EH 9 Claims



1. In a fuel injection system for an internal combustion engine (1) having at least one fuel injection valve (2, 7) controlling flow of fuel to the engine during the opening time of the valve;

means (20, 21, 22) generating an electrical pulse in synchronism with rotation of the engine, said pulse having a pulse duration representative of speed of the engine;

a main capacitor (C1);

a charge circuit (A) controlled by the pulse generating means connected to charge the main capacitor (C1) during said pulse;

a discharge circuit (E) controlled by an operating parameter of the engine connected to discharge said main capacitor (C1) at a rate controlled by said engine operating parameter, and generating a timing pulse during the time of discharge of said main capacitor (C1);

and connecting circuit means (24, 25, 10) applying an opening pulse to the fuel injection valve, or valves (2, 7) having a time duration controlled at least in part by said timing pulse;

a stabilization circuit (29) to stabilize the charge rate of the maincapacitor (C1) under transient engine operating conditins comprising

an auxiliary capacitor (C2);

a charge circuit (L) connected to the auxiliary capacitor (C2);

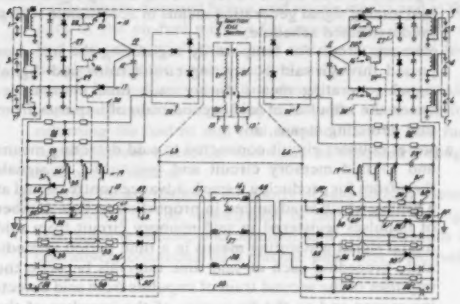
and a diode coupling the auxiliary capacitor in parallel with the main capacitor (C1), the diode being poled to permit current flow from the main capacitor to the auxiliary capacitor when the voltage across the main capacitor exceeds the voltage across the auxiliary capacitor to thereby decrease the rate of charge on the main capacitor as supplied by said main capacitor charge circuit (A).

4,015,564
IGNITION SYSTEM FOR INTERNAL-COMBUSTION ENGINES HAVING TIMING STABILIZING MEANS

Arthur O. Fitzner, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Aug. 14, 1974, Ser. No. 497,319
Int. Cl.² F02P 5/04
U.S. Cl. 123—117 R 24 Claims

1. In an ignition system for an internal combustion engine employing a triggered switch means for periodically transferring energy to a spark plug, said triggered switch means including an input means having a threshold forward switching level and a reverse blocking level, an improvement in an engine driven triggering signal source and its interconnecting circuit developing time spaced actuation of said switch means adapted to be connected to an engine and comprising, source means having an input means adapted to be driven in synchronism with said engine and connected to the switch means, said source means establishing an output signal operable to actuate said switch means, bias signal means connected in circuit with the source means and said switch means and establishing a modifiying bias signal applied substantially proportional to the output of the source means and utilizing a significant portion of the bias signal to modify the output signal from said source means during triggering periods to establish an effective variable threshold forward switching level essentially matched to the output voltage of the source and thereby maintain a constant triggering train for varying speed of said source means,

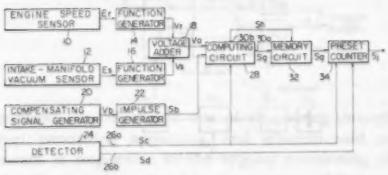


said bias signal level rising significantly above said reverse blocking level of said switch means, signal limiting means connected across said bias means and across the input means and including voltage divider means having intermediate tap connected to said input means for impressing only a portion of the bias signal as a reverse voltage on said input means of said triggered switch means in the interval between triggering periods, said reverse voltage being limited to a value essentially below the reverse blocking level of the switch means.

4,015,565
SPARK-ADVANCE CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINE

Shigeo Aono, Tokyo; Kenji Ikeura, Yokohama, and Yoshitaka Hata, Fujisawa, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed June 12, 1975, Ser. No. 586,214
Claims priority, application Japan, June 21, 1974, 49-70288
Int. Cl.² F02P 1/00
U.S. Cl. 123—117 D 11 Claims



1. An apparatus for controlling spark advance in an internal combustion engine having an output shaft and an intake manifold, the apparatus comprising, in combination:

analog signal generating means responsive to output speed of the engine and to vacuum in said engine intake manifold for producing an analog signal which varies with detected engine output speed with the detected intake manifold vacuum in accordance with respective predetermined schedules,

digital signal generating means responsive to preselected operating parameters which affect performance characteristics of the engine for producing a first train of impulses with a frequency related to said parameters,

detecting means responsive to rotational motion of the output shaft of the engine for producing a second train of impulses each representative of a timing at which a respective piston in each cylinder of said engine reaches a predetermined position relative to its associated engine

cylinder and a third train of impulses having a frequency proportional to angular displacement of said output shaft,

a computing circuit coupled to said detecting means to said digital signal generating means and to said analog signal generating means and responsive to each of the impulses of said second train of impulses from said detecting means for passing therethrough impulses of said first train of impulses from said digital signal generating means for a period of time which varies with the analog signal from said analog signal generating means in accordance with a predetermined schedule,

a memory circuit for temporarily registering the impulses passed through said computing circuit from said digital signal generating means during each time interval between the impulses of said second train of impulses from said detecting means, and

a preset counter circuit connected to said detecting means and to said memory circuit and responsive to signals therefrom for producing a spark-advance control signal at a timing which is advanced in proportion to that number of impulses registered in said memory circuit from said digital signal generating means in a time period immediately preceding each of said time intervals between the impulses of the second train of impulses from said detecting means and to the frequency of the impulses of the third train of impulses from said detecting circuit impressed on the counter circuit during each of said time intervals.

4,015,566
ELECTRONIC IGNITION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

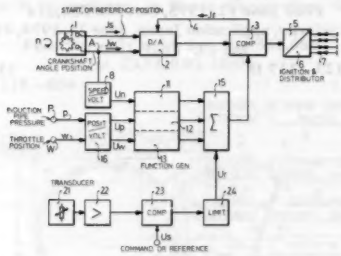
Josef Wahl, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed June 17, 1975, Ser. No. 587,627

Claims priority, application Germany, July 29, 1974, 2436421

Int. Cl.² F02Q *5/04*

U.S. Cl. 123—117 R **14 Claims**



1. Electronic ignition system for internal combustion engines to control the timing of ignition instant with respect to engine crankshaft position having

sensing means (**1, 8; 16**) generating at least one sensing signal representative of an engine operation parameter;

at least one function generator (**11, 12, 13**) connected to and controlled by the respective signal generating means and generating a signal representative of ignition timing in dependence on the respective parameter being sensed;

means (**3, 5, 6, 15**) connected to and controlled by said function generator and providing an ignition trigger signal at a predetermined instant of time with respect to engine crankshaft position; and

a closed control loop (**3, 5, 6, 7, 19, 20, 21, 21', 23, 24**) including

a. the engine (**19**) itself,

b. a transducer (**21, 21'**) responsive to an actual engine operating condition varying with variation in ignition timing and providing an operating signal,

c. means (**Us, 35, 36**) providing a command reference signal representative of a commanded engine operating condition,

d. a comparator (**23**) having the operating signal applied thereto and comparing said operating signal with the predetermined command reference signal (**Us**) and providing an error output signal (**Ur**),

the error output signal being applied as a superimposed additional control signal to said ignition trigger signal providing means (**3, 5, 6, 15**) to additionally affect ignition timing in accordance with the error signal in said loop.

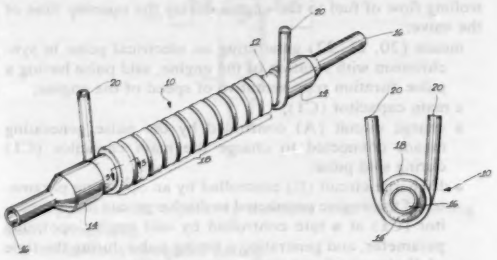
4,015,567
GASOLINE PREHEATER

Gary Zabenskie, Waterloo, Canada, assignor to Jan Wassing, Kitchener, Canada

Filed May 12, 1975, Ser. No. 576,410

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 E **10 Claims**



1. A gasoline pre-heater in combination with a liquidcooled internal combustion engine, the pre-heater comprising a coil of copper tubing through which gasoline is passed prior to supply to the internal combustion engine for combustion, said tubing coil being in tensioned contact about a copper cylinder through which internal combustion engine coolant is passed and fixed adjacent each tubing coil end to the cylinder, and wherein the cylinder contacting tubing of the tubing coil has a cross-sectional configuration substantially that of a centrally waisted ellipse.

4,015,568
INTAKE MANIFOLD PRESSURE REGULATOR OF INTERNAL COMBUSTION ENGINE

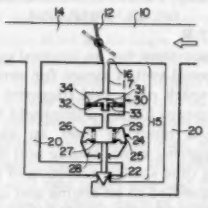
Masakazu Horiye, Tokyo; Kenichi Sasaki, and Mitsutaka Konno, both of Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Sept. 12, 1975, Ser. No. 612,864

Claims priority, application Japan, Sept. 17, 1974, 49-11863[U]

Int. Cl.² F02M *23/04*, *7/12*

U.S. Cl. 123—124 R **5 Claims**



1. An intake manifold pressure regulator of an internal combustion engine having an induction passage and an intake manifold communicable through a throttle valve, comprising a

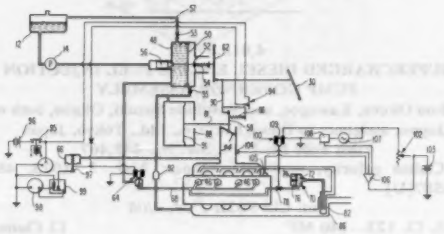
port means so located and arranged that substantially atmospheric pressure prevails at said port means when the throttle valve is in its fully closed position, while the pressure at said port means drops below the atmospheric as the throttle valve moves to an open position; a by-pass around and exclusive of said throttle valve; a by-pass valve in said by-pass; means operatively connected to said by-pass valve and being responsive at a predetermined retard to the substantially atmospheric pressure at said port means for closing said by-pass valve to prevent by-passing around and exclusive of said throttle valve.

4,015,569

FUEL METERING AND VAPORIZING SYSTEM FOR INTERNAL COMBUSTION ENGINES

Ervin Leshner, and Michael D. Leshner, both of Cherry Hill, N.J., assignors to Fuel Injection Development Corporation, Bellmawr, N.J.

Filed Jan. 7, 1976, Ser. No. 647,120
Int. Cl.² F02M *7/18, 31/02*
U.S. Cl. 123—133 **28 Claims**



1. A charge forming system for an internal combustion engine including at least one cylinder and having an inlet manifold including a throttle member, comprising:

manual control means;

transducer means adapted to be coupled to the engine for providing a manifestation of changes in developed engine power;

regulating means for controlling the flow of fuel and air to the engine, said regulating means being coupled to said manual control means and said transducer means and responsive to the latter to progressively change the fuel-to-air ratio of the charge supplied to the engine in a fixed direction as a consequence of a manifested change in developed engine power and continuing the progressive change in fuel-to-air ratio until the manifested change in developed engine power ceases; and

vaporizing means coupled to said regulating means and adapted to be coupled in heat transfer relation to the engine for receiving and vaporizing liquid fuel.

4,015,570

LIQUID-FUEL VAPORIZER

S. Smith Sommerville, 6305 Old Stage Road, Raleigh, N.C. 27603

Filed July 28, 1975, Ser. No. 599,889
Int. Cl.² F02M *31/00*
U.S. Cl. 123—133 **9 Claims**

1. A fuel vaporizing apparatus adapted to work in conjunction with an internal combustion engine or the like to vaporize fuel and mix the same with a system of air passing therethrough to form an air-fuel mixture, said fuel vaporizing apparatus comprising:

a. a housing means adapted to receive and channel a system of air therethrough;

b. spray nozzle means projecting interiorly of said housing means for spraying fuel in an atomized state interiorly of said housing means wherein the fuel vapor resulting from the atomized fuel mixes with air of the system of air passing through said housing means to form an air-fuel mixture;

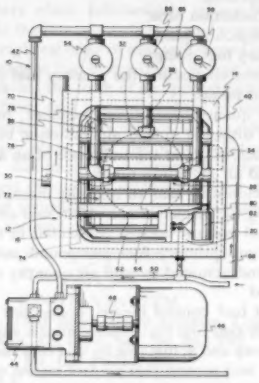
c. a fuel supply system including pump means operatively connected between a source of fuel and said nozzle means for supplying fuel to said nozzle means;

d. control means operatively connected and associated with said nozzle means for selectively controlling the quantity of fuel expelled from said nozzle means;

e. baffle means disposed below said nozzle means and in the path of the air-fuel mixture for intercepting droplets of fuel not substantially vaporized and for urging said fuel droplets from the passing air-fuel mixture;

f. means for capturing said fuel droplets not substantially vaporized and intercepted by said baffle means and for returning the fuel of said fuel droplets back to said fuel supply system where the same can be rerouted through said nozzle means;

g. heating means disposed interiorly of said housing means for assisting in the vaporization of fuel passing through said housing means; and wherein said control means is operatively connected to a throttle plate that effectively



controls the volumetric rate of air passing through said fuel vaporizing apparatus, and wherein said control means is responsive to the angular positioning of said throttle plate for controlling the quantity of fuel expelled from said nozzle means, and wherein said nozzle means includes a plurality of separate nozzles operatively connected to said fuel supply system and projecting interiorly of said housing means; and wherein said control means comprises a series of solenoid switches wherein each solenoid switch is operatively connected to one respective nozzle and operative to open and close the same, and a step switching mechanism operatively connected to each of said solenoid switches and responsive to the angular position of said throttle plate for activating certain solenoid switches as said throttle plate is rotated from a closed position to a completely opened position such that as the angular position of said throttle plate is changed respective solenoid switches are particularly actuated to open or close respective nozzles and to consequently vary the quantity of fuel being expelled into said housing means relative to the angular position of said throttle plate.

4,015,571
FUEL-AIR MIXTURE CONTROLLER FOR INTERNAL COMBUSTION ENGINES

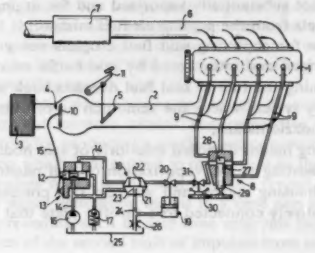
Gerhard Stumpp, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Feb. 20, 1975, Ser. No. 551,498

Claims priority, application Germany, Mar. 1, 1974, 2409775

Int. Cl.² F02M *39/00*

U.S. Cl. 123—139 AW **8 Claims**



1. A fuel-air ratio regulator for an internal combustion engine, comprising:
   a. an air induction tube;
   b. a fuel injection pump;
   c. a primary fuel pump;
   d. a fuel line connecting the primary fuel pump to the fuel injection pump;
   e. an air quantity measuring member, having a portion thereof disposed in said air induction tube for displacement therein under the influence of an air stream drawn into said air induction tube;
   f. means mounting said air quantity measuring member for effecting the displacement within said air induction tube;
   g. first fuel control means, connected in the fuel line between said primary fuel pump and said fuel injection pump and actuated by said air quantity measuring member; and
   h. second fuel control means, connected in the fuel line between said first fuel control means and said fuel injection pump and actuatable by said first fuel control means so that said second fuel control means meters out a fuel quantity which maintains a predetermined desired fuel-air ratio wherein said first fuel control means includes:
      i. a fuel valve with a movable valve member actuated mediately by said air quantity measuring member, whereby motions of said movable valve member tend to produce changes in the pressure gradient across said fuel valve which are counteracted by said fuel control means, and the flow cross section of said fuel valve corresponds to the air quantity aspirated by the engine;
      ii. a differential pressure valve connected both upstream and downstream of said fuel valve; and
      iii. a servo motor connected in the fuel line between said pressure differential valve and said second fuel control means, said servo motor being actuated by said differential pressure valve to influence the operation of said second fuel control means.

4,015,572
CHARGE FORMING SYSTEM FOR INTERNAL COMBUSTION ENGINES

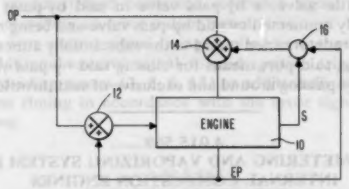
Ervin Leshner, and Michael D. Leshner, both of Cherry Hill, N.J., assignors to Fuel Injection Development Corporation, Bellmawr, N.J.

Filed Jan. 7, 1976, Ser. No. 647,326

Int. Cl.² F02M *7/18*; F02B *17/00*, *3/02*

U.S. Cl. 123—139 AW **40 Claims**

1. A charge forming system for optimizing the air-to-fuel ratio of an internal combustion engine, comprising:
   control means for varying the flow of fuel and air to the engine;
   means adapted to be coupled to the engine for producing a manifestation of delivered engine power;



   servo means coupled to said control means for progressively monotonically altering the air-to-fuel ratio of the charge delivered to the engine in response to a manifested change in delivered engine power at least until said manifested change ceases.

4,015,573
SUPERCHARGED DIESEL ENGINE FUEL INJECTION PUMP GOVERNOR ASSEMBLY

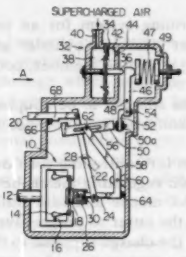
Rikuo Okura, Kawagoe, and Yasuhide Suzuki, Okabe, both of Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Feb. 14, 1974, Ser. No. 442,467

Claims priority, application Japan, Mar. 5, 1973, 48-26587[U]

Int. Cl.³ F02D *1/04*, *1/06*

U.S. Cl. 123—140 MP **12 Claims**



1. In an internal combustion engine having a fuel injection pump, a governor assembly for said injection pump, said governor assembly comprising:
   a control rod operatively connected to the fuel injection pump and movable from a position to provide maximum fuel injection volume for starting the engine in a direction to decrease the fuel injection volume;
   a centrifugal governor driven from the engine and operatively connected to said control rod to urge said control rod from said position of maximum fuel injection volume at zero engine speed in said direction to decrease the fuel injection volume according to a predetermined function of engine speed;
   pressure-sensitive means responsive to an engine induction air pressure and operative to limit movement of said control rod toward said position of maximum fuel injection volume to a position corresponding to a predetermined maximum fuel injection volume corresponding to sensed induction air pressure when connected to said control rod;
   a first linkage engageable with said centrifugal governor and arranged to connect said pressure sensitive means to said control rod only when sensed engine speed is above a predetermined value; and
   a second linkage to operatively connect said centrifugal

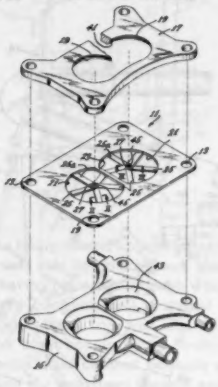
governor to said control rod, including yieldable means arranged to yield only when movement of said control rod is being limited by said pressure-sensitive means to prevent breakage of said governor assembly.

4,015,574

APPARATUS FOR IMPROVING FUEL-AIR MIXTURE

Roy A. Hanff, 569 Lawrence Drive, San Luis Obispo, Calif. 93401

Filed Nov. 18, 1974, Ser. No. 524,885
Int. Cl.² F02M 29/00
U.S. Cl. 123—141 25 Claims



1. A device for improving a carbureted air-fuel mixture comprising

a plate including

a plurality of openings in said plate through which a carbureted air-fuel mixture may be passed, each opening spaced and segregated from all adjacent openings and having a total unobstructed area equal to that of a carburetor bore with which each opening in said plate may be aligned when said plate is employed with a carburetor,

a plurality of spokes of triangular cross-sectional configuration radially fixedly located in each opening, each having a first surface against which a first portion of an air-fuel mixture passed through said opening may be deflected into a turbulent flow in a direction along a generally obtuse angle relative to the axis of said opening and

a second surface across which a second portion of such an air-fuel mixture may be deflected into a turbulent flow in a direction generally perpendicular to the axis of said opening, and

means for reducing the centrifugal force of such mixture portions deflected by said first and second surfaces and for ensuring mixture flow at the center of each said opening.

4,015,575

INTAKE SYSTEM WITH FOCUSING MEANS

Albert H. Fox, Village of Shoreview, Minn., assignor to Bryce J. Fox and Edna R. Fox, Village of Shoreview, Minn., part interest to each

Continuation-in-part of Ser. No. 417,879, Nov. 21, 1973, abandoned. This application Apr. 10, 1975, Ser. No. 566,791
Int. Cl.² F02M 29/00
U.S. Cl. 123—141 14 Claims

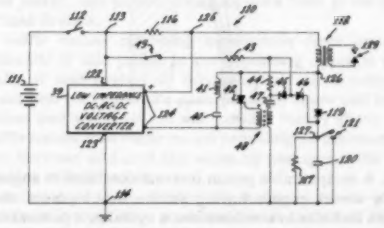
1. An intake system adapted to supply a substantially intimately blended combustible mixture to a combustion machine, said system comprising conduit means for conducting a flowing stream of fuel and air to a combustion machine, upstream air entrance means for introducing air into said conduit means, upstream fuel inlet means for introducing fluid fuel into said conduit means, and mixing means downstream from said air entrance means and from said fuel inlet means, said mixing means comprising a peripheral flow focusing structure for redirecting the flow of at least substantially all peripheral portions of said stream from vectors of generally linear flow substantially adjacent the interior surface of said conduit means to vectors of inward flow interjacently substantially converging toward a central zone removed from said interior surfaces of said conduit means and removed form said focusing structure, said converging vectors of flow being effective to cause substantially intimate blending of the air and fuel of said flowing stream, said focusing structure being characterized by comprising wall means extending inwardly within said conduit means from substantially the entire intersection between an imaginary plane substantially transverse to said conduit means and the interior surface of said conduit means, said outermost peripheral edge of said wall means being fixed to said conduit means at said intersection, at least a portion of said wall means having the form of an approximately annular rise wall spaced from said interior surface of said conduit means and extending upstream within said conduit means from said imaginary plane, said rise wall including passage means extending therethrough substantially adjacent said imaginary plane and throughout said rise wall for the flow of said stream in said substantially converging fashion through said rise wall into the said central zone.

4,015,576

IGNITION SYSTEM

Edward M. Junak, 1835 Bass, Grand Junction, Colo. 81501

Filed Apr. 22, 1974, Ser. No. 462,595
Int. Cl.² F02P 1/00
U.S. Cl. 123—148 E 5 Claims



1. In an ignition system for generating energy pulses for firing spark plugs in combustion chambers of an engine thereby igniting a combustible fuel mixture within said combustion chambers comprising:

a. a source of electrical energy,

b. an inductive means for generating inductive pulses for storing and releasing electromagnetic energy, and

c. a contact breaking means for periodically making and breaking a circuit between said source of electrical energy and said inductive means whereby said inductive means receives energy from said source of electrical energy through said contact breaking means in one condition of said contact breaking means and releases said

energy to said spark plugs in a second condition of said contact breaking means, the improvement comprising:

1. a pulse generating means for generating short pulses in addition to said inductive pulses, said pulses being of short duration and having fast rise time relative to said inductive pulses,
2. combining means for combining said short pulses and said inductive pulses, and
3. means for isolating said contact breaking means from said inductive means at least for the duration of said short duration pulse,

whereby a pulse produced by an existing inductive ignition system is caused to have improved rise time and the contact breaking means are protected during a destructive portion of said pulse by the addition of the recited means, said combining means combining said short pulses having a first polarity and produced by said pulse generating means with said inductive pulses having a second polarity produced by said inductive means by coupling said pulse generator across said inductive means so that the inductive pulses and the short pulses are of opposite polarity, said isolating means being poled and connected between said inductive means and said contact breaker means for conduction responsive to said inductive pulses and for isolation responsive to said short pulses.

4,015,577

RECIPROCABLE PISTON INTERNAL COMBUSTION ENGINE, ESPECIALLY DIESEL ENGINE

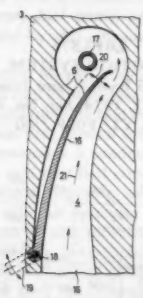
Ludwig Elsbett, and Gunter Elsbett, both of Industriestrasse 14, D 8543 Hilpoltstein, Germany

Filed Aug. 22, 1973, Ser. No. 390,493

Claims priority, application Germany, Aug. 23, 1972, 2241355

Int. Cl.² F01L *3/00*

U.S. Cl. 123—188 M **5 Claims**



1. A reciprocable piston internal combustion engine, especially diesel engine having smoke development therewith, which includes in combination: a cylinder, a piston reciprocable in said cylinder and provided with a combustion chamber therein for receiving fuel and air for combustion, a cylinder head associated with said cylinder and comprising recess means aligned with said combustion chamber, said cylinder head also being provided with air conveying passage means leading into said recess means, valve guiding means arranged in said recess means, valve means guided in said valve guiding means for continuously controlling change in the supply of air from said recess means to said combustion chamber, and air guiding means simultaneously movably arranged within said air conveying passage means and including a movable vane pivoted at a point remote from said recess means with a free end extending toward said valve guiding means so that said free end overlies said recess means, said free end being movable to restrict the passage of air into said chamber and vary the velocity of circulating air, thereby subjecting the fuel-air mixture in the combustion chamber to a strongly defined twist during all load ranges of the internal combustion engine keeping relatively low the supply of oxygen to the combusting the fuel-air mixture in the center of the combustion chamber.

4,015,578

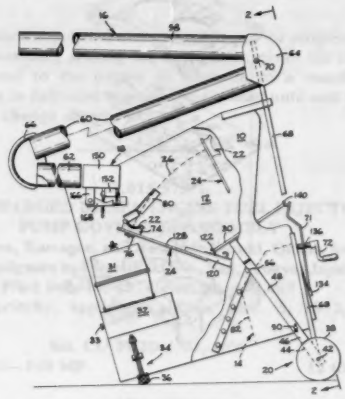
BALL THROWING APPARATUS

Donald W. Wright, 911 Old Orchard Road, Campbell, Calif. 95008

Filed Apr. 27, 1973, Ser. No. 355,152

Int. Cl.² F41B *3/04*

U.S. Cl. 124—7 **6 Claims**



1. A ball-throwing apparatus comprising:
a. a flexible arm mounted for pivotal movement;
b. ball-receiving means mounted on one end of said arm;
c. means for biasing said arm along an arcuate path in one direction; and
d. means for translating the movement of said arm along said arcuate path in a direction opposite to said one direction and for releasing said arm at one extreme point along said arcuate path to permit said arm to move under the influence of said biasing means to the other extreme point of said arcuate path,
e. said ball-receiving means including a slide member having an arcuate surface, a cup having an arcuate shape with one surface conforming to the contour of the arcuate surface of said slide member, and releasable locking means joining said cup with said slide member at various peripheral positions of said cup, whereby said cup can be releasably locked in one of a plurality of peripheral positions with respect to said slide member to alter the angle trajectory of a thrown ball.

4,015,579

SPACE HEATER

George H. Wirth, New Athens, and Sherwin L. Derby, O'Fallon, both of Ill., assignors to Autocrat Corporation, New Athens, Ill.

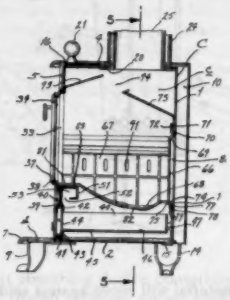
Filed Aug. 25, 1975, Ser. No. 607,683

Int. Cl.² F24C *1/14*

U.S. Cl. 126—63 **20 Claims**

1. A space heater comprising a cabinet having a rear wall, a base wall, a front wall, parallel side walls, and a top wall, said walls internally defining a combustion chamber, said front wall having a first opening, closure means provided in said first opening optionally permitting access to said combustion chamber therethrough, a pair of laterally spaced apart, upstanding side liners provided in said combustion chamber inwardly of the adjacent cabinet side walls, an upstanding

back liner extending between said side liners at the rearward ends thereof and being spaced forwardly of said rear wall, said side liners and said back liner terminating at their upper ends spacedly below said cabinet top wall, a fuel-supporting, apertured grate provided spacedly upwardly of said cabinet bottom wall and cooperating with said side liners and back liner to define a firebox, the spacing between said side liners and back liner and the adjacent cabinet walls defining air passages,



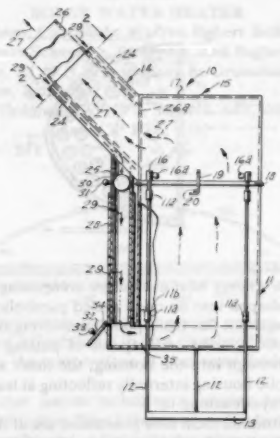
said air passages being closed at their upper ends in the upper end portion of said side liners and back liners, said side liners and back liner having openings through which said firebox and said air passages communicate, exhaust means projecting upwardly of said cabinet top wall and communicating with said combustion chamber and said firebox, and means for introducing air into said cabinet beneath said grate for flow upwardly through the apertures thereof and into said air passages.

4,015,580

SAFE HEATER

Leonard V. Moore, 602 Redfield Ave., Los Angeles, Calif. 90042

Filed Dec. 10, 1975, Ser. No. 635,434
Int. Cl.² F24B *3/00*
U.S. Cl. 126—65 **3 Claims**



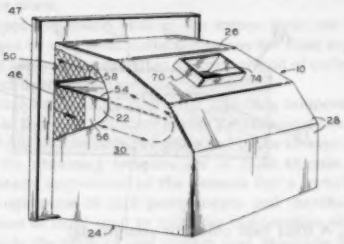
1. A heater for the burning of fuels indoors, comprising, a base, a plurality of equally spaced apart legs secured to said base, a fire box elevatable on said legs of said base, a main heating chamber supported on said legs of said base, intake air and exhaust pipe means secured to said main heating chamber, and air intake pipe means secured to said fire box, wherein said exhaust pipe is secured fixedly over the opening in the side wall of said main heating chamber and said air intake pipe is secured on the outer periphery of said exhaust pipe, fixedly, and said air intake pipe intersects and is secured fixedly to air intake pipe means slideably received within an external pipe secured fixedly to said fire box, said intake pipe means slideably received therein, having adjustable damper valve means which controls the flow of fresh air into a breathing chamber secured fixedly to the bottom of said fire box, said breathing chamber having hinged door means for covering and uncovering said breathing chamber, said air travelling through fuel support means secured fixedly within said fire box.

4,015,581

FIREPLACE HEATER

Donald S. Martenson, Rte. 1, Box 20-A, Beavercreek, Oreg. 97004

Filed Mar. 20, 1975, Ser. No. 560,218
Int. Cl.² F24B *1/18*
U.S. Cl. 126—121 **2 Claims**



1. A self-contained fireplace heater adapted for insertion within existing fireplaces comprising:

a metal firebox including a firebox chimney for exhausting products of combustion from said firebox into a fireplace chimney, a front access opening for positioning at the front of a fireplace, a controllable draft opening below said access opening, and access door means for closing said access opening to retain within said firebox heat from a fire therewith,

a jacket surrounding and integral with said firebox including wall portions spaced laterally and vertically outwardly from corresponding wall portions of said firebox to provide an air conduction space between said firebox and said jacket, said jacket having an open front at the front of said firebox,

and baffle means extending transversely from opposite sidewalls of said jacket to corresponding opposite sidewalls of said firebox to subdivide said air conduction space into cold air intake passage means below said baffle means and warm air exhaust passage means above said baffle means, said baffle means providing for communication between said cold and warm air passages at the rear interior of said jacket,

said access door means comprising transparent heat-resistant front access door panel means at the front access opening of said firebox selectively operable to open and close said front access opening,

said firebox including opposite vertically extending sidewalls extending rearwardly from said front access opening, a generally vertically extending rear wall portion joining the rear ends of said opposite sidewall portions and an upper wall joining the upper ends of said sidewalls and rear and wall,

said upper wall including a front upper wall portion sloping upwardly and rearwardly from adjacent the upper end of said front access opening and a rear upper wall portion sloping downwardly and rearwardly from the rear end of said front upper wall portion to the upper end of said rear wall to provide the upper portion of said firebox with a domed effect,

said baffle means between said jacket and firebox sidewalls extending rearwardly from the upper end of said front access opening to an upper rear wall portion of said firebox so that the vertical extent of said intake passage means is substantially greater than the vertical extent of said exhaust passage means,

said intake passage means having intake openings at opposite sides of said firebox access opening extending continuously vertically from the lower ends of said firebox sidewalls to the front edges of said baffle means.

4,015,582

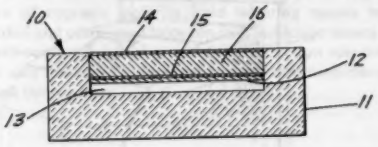
SOLAR HEAT COLLECTOR

Benjamin Y. H. Liu, Minneapolis; Richard C. Jordan, and Klaus Willeke, both of St. Paul, all of Minn., assignors to The Regents of the University of Minnesota, Minneapolis, Minn.

Filed May 31, 1974, Ser. No. 474,941

Int. Cl.² F24J 3/02

U.S. Cl. 126—270 **14 Claims**



1. A solar heat collector comprising:

A. a heat insulative base,

B. a layer of heat absorptive material overlying said insulative base,

C. a light transmitting insulating protective covering overlying said heat absorptive material, said covering being impervious to the passage of air and functioning as an air buffer, and including:

1. an outer non-porous light transmitting sheet of air impermeable material spaced from said heat absorptive material,

2. a layer of light transmitting insulating material under said outer sheet and substantially coextensive therewith and confined within and occupying at least part of the space between said outer sheet and the heat absorptive layer, said insulating material being a lightweight packing having a myriad of gas-containing voids substantially uniformly distributed throughout the mass of the packing and sandwiched between said outer sheet an intermediate non-porous sheet of air impermeable material overlying said heat absorptive layer, and

D. passage means spaced from said insulating layer for circulating a heat transfer fluid through the collector in close proximity to said heat absorbing layer.

4,015,583

DEVICE FOR RECEIVING OR EMITTING RADIATION ENERGY

Nikolaus Laing, Hofener Weg 35-37, 7141 Aldingen near Stuttgart, Germany

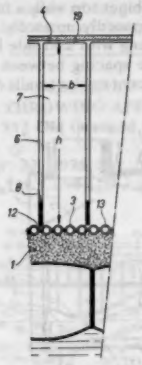
Continuation-in-part of Ser. No. 370,839, June 18, 1973, abandoned. This application May 6, 1975, Ser. No. 574,881

Claims priority, application Austria, June 23, 1972, 5406/72

Int. Cl.² F24J 3/02

U.S. Cl. 126—270 **4 Claims**

1. An energy transmission device through which energy may pass comprising an optically active layer adapted to face the sun and a plurality of parallel extending U-shaped channels having vertically extending legs covering the side of said layer facing the sun wherein said channels are formed by a single sheet of a thin film-like radiation permeable plastic material folded along fold lines to form said U-shaped channels and having a weight means positioned exteriorly of said channels along said fold lines whereby when said channels are pressurized the plastic material will move against said weight means to form an end of a leg of said U-shaped channel, and wherein the width of said U-shaped channels is less than the height thereof to reduce convection currents within the channels.



4,015,584

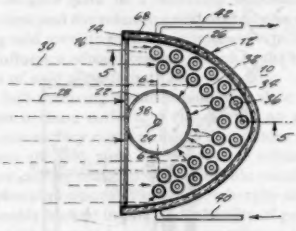
PARABOLIC SOLAR ENERGY HEAT EXCHANGER

Louis B. Haberman, c/o Solarex Hydraulics Corp., 14 Lucon Drive, Deer Park, N.Y. 11729

Filed Aug. 18, 1975, Ser. No. 605,757

Int. Cl.² F24J 3/02

U.S. Cl. 126—271 **28 Claims**



1. A solar energy heat exchanger comprising

a. walls shaped into an open ended parabolic housing;

b. a transparent flat front plate connecting the ends of the parabolic housing and capable of passing the sun's rays therethrough into the housing, the inner surface of said parabolic housing internally reflecting at least some of the sun's rays reaching it;

c. a longitudinal focal tube positioned about the focal line of said parabolic housing, capable of retaining a fluid medium therein, and receiving both direct sun rays passing through said front plate and reflected sun rays from said inner surface of the parabolic housing; and

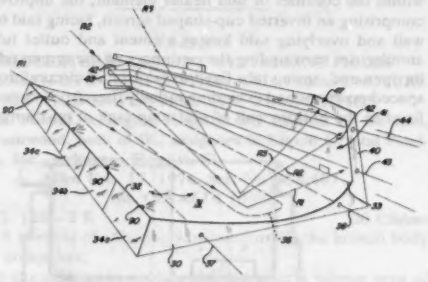
d. a top and bottom cover on said parabolic housing to form a complete enclosure therewith, and wherein said flat front plate is of glass material, said focal tube is of glass material, said focal tube is molded of one piece with said front plate, and said focal tube is tangential to said front plate.

4,015,585

SOLAR HEATING APPARATUS

Arthur Fattor, 5380 S. Holly, Englewood, Colo. 80110

Filed Aug. 21, 1975, Ser. No. 606,558
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **8 Claims**



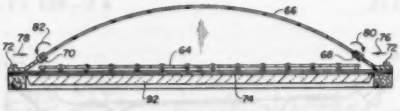
1. Solar heat absorbing device comprising
a. parabolic trough reflector means having its horizontally-oriented extent in straight lines and its vertical extent along a parabola, for focusing solar radiation into a narrow, linear area, which varies vertically at various seasons of the year mounted in a general horizontal position;
b. upright, generally vertical, target means depending upwardly along the length of an edge of said reflector means in position to be impinged on by the linear area reflected radiation as well as receiving direct solar radiation, and an overhang target means depending from said upright target means extending over said reflector means;
c. a plurality of lengths of fluid carrying pipes mounted on said target means to receive solar radiation and having inlet and outlet means for circulating fluid therethrough; and
d. said target and carried pipes being blackened.

4,015,586

SOLAR WATER HEATER

Henry J. Vroom, Commack; Warren Robert Bolle, Old Bethpage; Herbert Schneider, Plainview, and Burton Swerdling, Hauppauge, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,258
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **3 Claims**



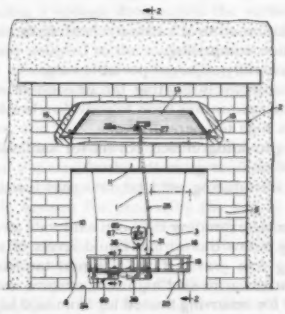
1. A heating system for utilizing solar energy to raise the temperature of a fluid that is in turn circulated by controllable means to raise the temperature of a separate fluid, said system comprising:
solar collector means including a housing having a base insulated by glass fiber blanket on one side covered by a vinyl vapor barrier, a flat collector plate supported above the base on the other side thereof, channel dome edge restraints spaced a predetermined distance apart on each side of said base, end frames between the dome edge restraints at each end, elastomeric seals in the form of rubber extrusions mounted in a contour on a portion of the end frames above said base, cap means to stabilize and affix the seals in proper orientation on the end frames, and a flat transparent closure bowed by having its sides in the channel dome edge restraints spaced apart a width less than the closure and its ends abutting the seals under the cap means on the end frames to provide an accurate dome over the base that will with the base, edge restraints and seals on said end frames seal the collector plate environment above the base which is insulated and protected from any surface thereunder by the insulating blanket and vapor barrier between the base and surface;
a heat exchanger connected to receive a fluid from said collector plate and return same;
storage tank means for a fluid to be heated, said storage tank means having its exterior walls in heat transfer relationship with said heat exchanger and fluid inlet and outlet means for a fluid to be heated by heat transferred to the walls of said storage tank means;
pump means in the return from heat exchanger to collector plate for circulating a fluid between said heat exchanger and said solar collector means;
flow directing valve means to prevent return flow from heat exchanger to collector plate in the means connected to permit the heat exchanger to receive fluid from said collector plate;
a pressurized expansion tank in the return from the heat exchanger to said solar collector means for fluid expansion and replenishment within a closed circuit of collector plate and heat exchanger; and
a differential temperature controller including temperature sensors in the solar collector means for obtaining temperature of fluid in the collector plate and in the storage tank means for obtaining temperature of fluid therein and relay means responsive to the sensors for a switch to control operation of said pump means and thereby the circulation of fluid used to raise the temperature of the fluid inside the walls of said storage tank means by heating said walls from said heat exchanger.

4,015,587

FIREPLACE DAMPER OPERATING MECHANISM

Walter R. Wincek, 3251 Alpine St., NE., Canton, Ohio 44721

Filed Mar. 11, 1976, Ser. No. 666,144
Int. Cl.² F23L *11/00*
U.S. Cl. 126—286 **9 Claims**



1. Fireplace damper operating mechanism for a fireplace of the type having a firebox and chimney flue including:
a. a damper plate pivotally mounted within the chimney flue for swinging movement between open and closed positions;
b. connecting rod means extending generally vertically downwardly from the damper plate, said connecting rod means having upper and lower ends with said upper end being operatively connected to the damper plate;
c. grate means located generally beneath the damper plate within the firebox;
d. latch means mounted on the front portion of the grate means;

e. generally L-shaped control rod means having first and second leg portions with said first leg portion being rotatably mounted on the grate means and extending generally horizontally centrally beneath the grate means between the front and rear of the firebox;

f. link means operatively connecting the rear end of said first leg portion to the lower end of the connecting rod means;

g. the second leg portion of the control rod means being located centrally in front of the grate means and adapted to swing through an approximate 90° arc between damper closed and open indicating positions, said second leg portion extending generally vertically upwardly in front of and above the grate means when in closed damper indicating position and extending generally horizontally along the front of the grate means and engageable with the latch means when in damper open indicating position to latch the control rod means in damper open position; and

h. movement of the second leg portion through the 90° arc rotates the control rod means to move the connecting rod means vertically to swing the damper plate between open and closed positions through the link means connection.

4,015,588

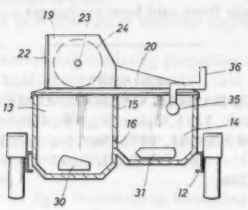
TAR KETTLE

Curtis R. Blackwell, San Antonio, Tex., assignor to Reeves Roofing Equip. Co., Inc., San Antonio, Tex.

Filed June 2, 1976, Ser. No. 697,934

Int. Cl.² E01C *19/45*; F24H *1/00*

U.S. Cl. 126—343.5 A **4 Claims**



1. In a pollution-control kettle for heating tar and the like, the combination comprising:

a pair of generally adjacent portable vats;

means for selectively heating tar in each of said vats to different temperatures so as to provide a low temperature vat and a high temperature vat;

means for providing closed covers for said vats to retard escape of noxious gases therefrom;

means for introducing cold tar into said low temperature vat;

conduit means extending between said vats at a level substantially below the normal liquid levels of said vats for providing free gravity flow of liquid tar from said low temperature vat to said high temperature vat;

and means for removing heated tar from said high temperature vat without removing said cover means therefrom, whereby the escape of noxious gases from said vats is retarded.

4,015,589

STEAM CLEANER PROTECTION SCREEN

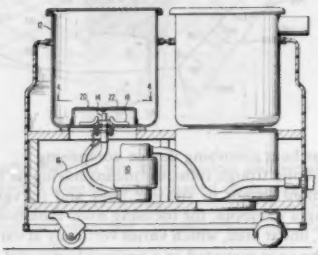
James M. Wimsatt, Carson City, and Carl Parise, Reno, both of Nev., assignors to Parise & Sons, Inc., Reno, Nev.

Filed Jan. 20, 1976, Ser. No. 650,647

Int. Cl.² A47L *5/00*

U.S. Cl. 126—344 **2 Claims**

1. In a steam cleaner for cleaning rugs, upholstry, and the like, said steam cleaner comprising: a soap tank adapted to contain a mixture of water and detergent during use of the steam cleaner, said tank including a bottom wall and a tubular electrical resistance heater element in the form of an open loop, single turn coil overlying the bottom wall of the soap tank for heating the mixture of water and detergent contained in the soap tank during use of the steam cleaner, and a tank outlet tube projecting through the bottom wall of the tank within the confines of said heater element, the improvement comprising an inverted cup-shaped screen, facing said bottom wall and overlying said heater element and outlet tube, an annular rim surrounding the periphery of the screen adjacent its open end, spring tabs fixed to said rim at circumferentially spaced positions and extending radially therefrom, spring clips fixed to the bottom wall of said soap tank at positions corresponding to said spring tabs on said screen on opposite sides of said resistance heater element with portions overlying the radially projecting ends of said tabs of said inverted cup-shaped cylindrical screen such that, said screen is pervious to the mixture of water and detergent contained in the soap tank during the use of the steam cleaner, and impervious to the fingers of users of the steam cleaner and of implements which may be inserted within said tank and acts simultaneously to filter foreign objects such as cigarette butts which may be introduced into the soap tank during use of the steam cleaner and wherein, said cup-shaped screen may be readily removed by rotating said screen to detach said tabs from said spring clips.



4,015,590

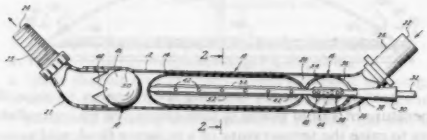
BALLOON ACTIVATED BLOOD PUMP

Nils A. Normann, Houston, Tex., assignor to Baylor College of Medicine, Houston, Tex.

Filed Apr. 12, 1976, Ser. No. 675,848

Int. Cl.² A61B *19/00*

U.S. Cl. 128—1 D **14 Claims**



1. A heart assist blood pump comprising,

a tubular conduit having an inlet and an outlet for connection with the circulatory system of the body,

a sealable opening in the conduit between the inlet and the outlet,

a gas line extending from the outside of said conduit through the opening and into the conduit,

an inflatable pump balloon positioned in the conduit and connected to the gas line, and the inside of the balloon in communication with the line for receiving gas from the line and inflating with positive line pressure and deflating with decreased line pressure thereby creating a pumping

action in the conduit, the inflated balloon having an outside diameter smaller than the inside diameter of the portion of the conduit in which the balloon is positioned,

an inlet valve positioned in the conduit between the balloon and the conduit inlet, and

an outlet valve positioned in the conduit between the balloon and the conduit outlet.

4,015,591

CHOLESTERIC LIQUID CRYSTALLINE PHASE MATERIAL-DYE COMPOSITION AND VENAPUNCTURE METHOD EMPLOYING THE COMPOSITION

Fred K. Suzuki, Arlington Heights, and Thomas W. Davison, Streamwood, both of Ill., assignors to Liquid Crystal Products, Inc., Arlington Heights, Ill.

Filed Feb. 17, 1976, Ser. No. 658,407
Int. Cl.² A61B *10/00*
U.S. Cl. 128—2 R **20 Claims**

12. A method of effecting vanapuncture in the human body which comprises:

a. in any order, (1) cooling the skin over a venous area of the body, and (2) applying directly on the skin over said area a layer about 100 to 300 microns thick of a composition having thermal color responsive characteristics, said layer exhibiting improved color contrast and high color intensity, said composition comprising an enantiotropic cholesteric liquid crystalline phase material exhibiting a mesophase color change at a temperature reached by the skin upon rewarming due to venous blood flow, and at least two oil-soluble dyes dissolved in said material in a total dye concentration of 0.01–1% by weight of the composition, each of said dyes reflecting light of a different wave length in the range of 400 to 700 nanometers, and said dyes together absorbing light of substantially all wave lengths within said range;

b. allowing the skin over said area to rewarm due to venous blood flow, until said material exhibits a mesophase color change to thereby delineate a vein therebeneath; and

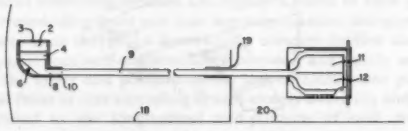
c. directing an instrument for venapuncture to a site in said area indicated by said delineation to constitute the location of a vein.

4,015,592

NUCLEAR MEDICINE SYSTEM FOR IMAGING RADIATION

Patrick Ralph Bradley-Moore, 510 E. 86th St., New York, N.Y. 10028

Continuation-in-part of Ser. No. 536,200, Dec. 24, 1974, abandoned. This application June 12, 1975, Ser. No. 586,170
Int. Cl.² A61B *6/00*
U.S. Cl. 128—2 A **21 Claims**



1. A nuclear medicine device for forming a nuclear radiation image at a location inside an animal body and for transmitting a representation of said image to a location outside the body comprising:

a front end comprising means for forming, at a location inside an animal body, a two-dimensional image of a selected nuclear radiation pattern; and

a middle part comprising means interfacing with the front end to receive therefrom a two-dimensional representation of the nuclear radiation pattern image formed therein and adapted to extend to a location outside the body to transmit the received two-dimensional representation thereto.

18. A nuclear medicine method of examining a selected portion of an animal body comprising the steps of:

causing said selected portion of the body to form a nuclear radiation pattern;

introducing into the animal body a device for detecting nuclear radiation and forming by said device, at a location inside the body, a two-dimensional image of said nuclear radiation pattern; and

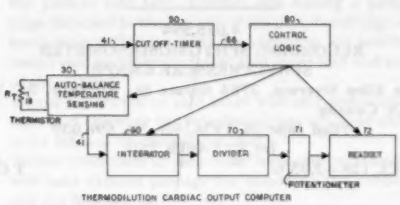
transmitting a two-dimensional representation of said image formed of the two-dimensional nuclear radiation pattern to a location outside the body.

4,015,593

APPARATUS AND METHOD FOR MEASURING CARDIAC OUTPUT

Virgil B. Elings, 5680 Via Salerno, Goleta, Calif. 93017, and David T. Phillips, 5107 Calle Asilo, Santa Barbara, Calif. 93111

Filed Mar. 24, 1975, Ser. No. 561,650
Int. Cl.² A61B *5/02*
U.S. Cl. 128—2.05 V **18 Claims**



THERMODILUTION CARDIAC OUTPUT COMPUTER

4. An autobalance circuit for sensing the temperature changes of a flowing blood-injectate mixture for use in equipment for measuring cardiac output by thermal dilution, the autobalance circuit including

a thermally variable resistor for detecting the temperature of the blood-injectate mixture in accordance with the resistance of the variable resistor,

a source of current coupled to the variable resistor for producing a voltage drop across the variable resistor in accordance with the resistance of the variable resistor,

first means coupled to the variable resistor and responsive to the change in the voltage drop across the variable resistor for producing an output voltage in accordance with the change in the voltage drop across the variable resistor, and

wherein the first means includes a source of reference voltage and a means for subtraction coupled to the source of reference voltage and to the voltage drop across the variable resistor for producing the output voltage from the first means in accordance with subtraction of the source of reference voltage from the voltage drop across the variable resistor,

a feedback loop coupled to the first means and responsive to the output voltage from the first means for producing a feedback signal having a value for providing a zero output voltage from the first means to initially balance the circuit and with the feedback loop including means for decoupling the output voltage from the first means to the feedback loop after the production of te zero output voltage from the first means and with the feedback loop including a holding control for maintaining the same value for the feedback signal after the output signal from the first means is decoupled for providing after the initial balance an output signal from the first means only in accordance with changes in the voltage drop across the variable resistor.

10. Apparatus for terminating the integration of a time-temperature curve for use in equipment for measuring cardiac

output by thermal dilution and with the time-temperature curve represented by a varying voltage having an initial rising portion to a peak and a decay from the peak, the apparatus including

first means responsive to the varying voltage for detecting and holding the peak voltage,

second means coupled to the first means and responsive to the peak voltage and to the varying voltage for detecting when the varying voltage decays to a first predetermined percentage of the peak voltage,

third means coupled to the first means and responsive to the peak voltage and the varying voltage for detecting when the varying voltage decays to a second predetermined percentage of the peak voltage lower than the first predetermined percentage,

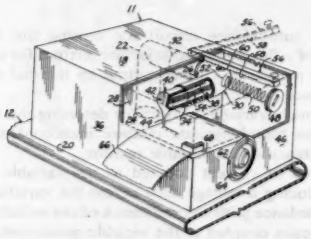
fourth means coupled to the second and third means and responsive to the detection by the second and third means for producing a cutoff signal which is time delayed after the detection by the third means in accordance with the time interval between the detection by the second and third means; and

fifth means coupled to the fourth means and responsive to the cutoff signal and the varying voltage for integrating the varying voltage relative to time and for terminating the integration in response to the cutoff signal.

4,015,594
RECORDING SPHYGMOMANOMETER SPHYGPRESSURE GRAPH

Lilian Ellen Siverson, 3784 Spruce St., Burnaky, BC V5G, 1X9, Canada

Filed June 14, 1976, Ser. No. 696,039
Int. Cl.² A61B 5/02
U.S. Cl. 128—2.05 G **1 Claim**



1. A blood-pressure-measuring device, comprising:

a blood-flow-restricting sleeve;

pump means for pressurizing said sleeve;

a housing secured to said sleeve, said housing having an aperture communicating with the interior of said sleeve;

a right-angular tube telescopically received at one end portion within the housing aperture;

a first spring normally biasing said one end portion of said right-angular tube into the aperture;

ratchet means including a rack pivotally supported by said housing in overlying relation with respect to said one end portion of said right-angular tube, said rack having a series of ratchet teeth projecting toward said right-angular tube;

a pawl secured to said right-angular tube and engaged by said ratchet teeth permitting telescopic movement of said right-angular tube into the housing aperture and preventing telescopic extending movement of said right-angular tube out of the housing aperture;

a scribing tube having one closed end and having its open end telescopically received within the other end portion of said right-angular tube;

a second spring within said scribing tube normally biasing said scribing tube into said other end portion of said right-angular tube;

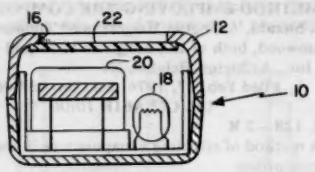
graph paper supported by said housing; and

a stylus secured to the closed end of said scribing tube and contacting said graph paper.

4,015,595
PHOTOPLETHYSMOGRAPHS

J. Malvern Benjamin, Jr., c/o Bionic Instruments, Inc., 221 Rock Hill Road, Bala Cynwyd, Pa. 19004

Filed Sept. 15, 1975, Ser. No. 613,301
Int. Cl.² A61B 5/02
U.S. Cl. 128—2.05 V **7 Claims**



1. A probe for use with a photoplethysmograph for the measurement of peripheral pulsatile blood flow comprising:

a casing having a window therein,

a light source and a photo-sensitive cell mounted in said casing to overlie said window,

said light source being arranged to direct light through said window,

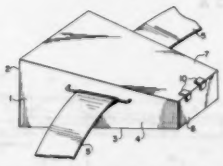
said photo-sensitive cell being arranged adjacent said light source to respond to light passing through said window as it is reflected from a field in line with said light source, and

a light control film mounted to extend across said window for collimating the light emitted from said light source to direct the same toward said field and for collimating the light reflected to said photo-sensitive cell and passing through said window.

4,015,596
APPARATUS FOR DETECTING AND INDICATING ELECTRICAL BODY POTENTIALS

Heinz Dehnert, Freiburg, Breisgau, Germany, assignor to Hugo Sachs Elektronik Kommanditgesellschaft, Hugstetten-March, Germany

Filed June 25, 1975, Ser. No. 590,369
Claims priority, application Germany, Mar. 29, 1975, 7510018[U]
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.06 R **5 Claims**



1. Apparatus for the detection and indication of electrical body potentials having a generally box-like structure, a cathode ray tube in said box-like structure, said cathode ray tube having a face constituting at least a part of one of the side walls of said box-like structure, first and second electrode means adapted to contact a human body in the respective places between which the body potential is to be measured, and means responsive to any potential difference between said first and second electrodes, controlling said cathode ray tube so that the latter indicates said body potentials, characterized by

said first and second electrode means comprising first and second electrodes on each of two sides of the box-like structure, said two sides being different from the side wall that includes the face of the cathode ray tube, and

said first and second electrode means comprising first and second electrodes each of which extends around the corner of the box that connects said two sides.

4,015,597

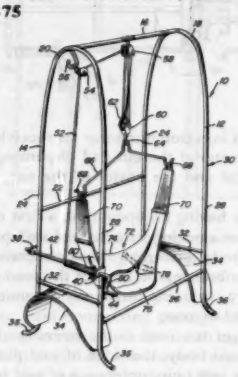
PORTABLE CERVICAL TRACTION APPARATUS

Tony J. Beaver, Boise, Idaho, assignor to Cervical Traction Company, Inc. (Entire), Boise, Idaho

Filed Oct. 9, 1975, Ser. No. 621,244

Int. Cl.² A61H 1/02

U.S. Cl. 128—75 **3 Claims**



1. In combination, a pair of upstanding generally parallel and inverted U-shaped opposite side frame portions disposed and spaced side-by-side relation, each of said frame portions including front and rear legs interconnected at their upper end portions by means of a curved bight portion extending therebetween, said frame portions being spaced apart at their lower ends a distance less than shoulder width but greater than head width, a front to rear extending brace rigidly secured between the lower end portions of the front and rear legs of each frame portion, an upper horizontal brace member extending between and rigidly anchored to said bight portions, transverse braces extending between and rigidly secured to each pair of corresponding front and rear legs intermediate the upper and lower ends thereof, a downwardly concave arched shoulder support received and extending between and rigidly secured to the lower end portions of the legs of each frame portion, said front to rear extending braces closely overlying and being secured to the longitudinal mid-portions of said shoulder supports, a block and tackle assembly depending downwardly from a central portion of said upper horizontal brace member and supporting a head sling therefrom, said block and tackle including a pull line free end portion, a winding member journaled from a lower portion of one of said opposite frame portions, the free end portion of said pull line being attached to said winding member for winding thereon, the upper end portion of said one opposite side frame portion including anti-friction guide means supported therefrom with which an intermediate portion of said winding member free end portion extending between said block and tackle and said winding member is guidingly engaged for longitudinal shifting relative thereto.

4,015,598

ANAESTHESIC SYSTEM

Glenn E. Brown, 24040 Summit Road, Los Gatos, Calif. 95030

Filed Sept. 5, 1975, Ser. No. 610,682

Int. Cl.² A61M 16/00

U.S. Cl. 128—188 **12 Claims**

1. A mask for administering gas to a patient comprising:

a. an inner cup-shaped wall arranged to fit over the nose or mouth of a patient and to engage the face of the patient along the peripheral edge thereof to form a gas chamber between the face of the patient and the inner surface of said inner wall;

b. an outer wall secured to and spaced from said inner wall to form an exhaust passage therebetween communicating with said chamber for receiving exhaust gas exhaled by the patient into said chamber and having a peripheral edge disposed in the vicinity of the peripheral edge of said inner wall defining means for receiving gas leaking between said peripheral edge of said inner wall and the face of the patient;

c. means connected to said inner wall and communicating with said chamber for introducing gas into said chamber to be inhaled by the patient; and

d. means connected to said outer wall and communicating with said exhaust passage for removing the exhaust gas and the leakage gas;

e. pressure control means connected between said inner and outer walls for communicating said chamber with said exhaust passage, said pressure control means being arranged for gas to enter said chamber from said means for introducing gas into said chamber when the patient inhales gas and arranged for exhaled gas to enter said exhaust passage from said chamber when the patient exhales gas.

4,015,599

ANESTHETIC DELIVERY SYSTEM

Laurence I. Peterson, Doylestown, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed July 21, 1975, Ser. No. 597,810

Int. Cl.² A61M 16/00

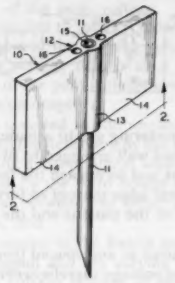
U.S. Cl. 128—188 **7 Claims**

1. A method of delivering a flow of anesthetic gas to a patient at a controllable, substantially constant concentration of such anesthetic in a gaseous carrier stream which comprises contacting the gaseous carrier stream with a bed of solid macroreticular polymeric adsorbent having adsorbed thereon a sufficient amount of anesthetic to produce a partial pressure of anesthetic high enough to cause sustained release of the anesthetic to the gaseous carrier stream to result in a concentration of anesthetic in the gaseous carrier stream suitable for anesthesia, maintaining the temperature of the bed below that which would cause volatilization of a detrimental amount of any extractable portion of the macroreticular polymeric adsorbent or decomposition of the adsorbent, but high enough to effect the sustained release of the anesthetic.

4,015,600
CATHETER NEEDLE ASSEMBLY

James P. Liautaud, River and Bluff Roads, Trout Valley, Cary, Ill. 60013

Filed July 7, 1975, Ser. No. 593,316
Int. Cl.² A61M 5/00, 5/32
U.S. Cl. 128—214 R 1 Claim

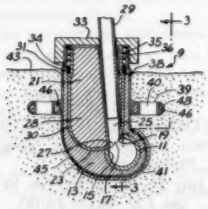


1. In a catheter needle assembly of the type having
a molded body including a central hub portion and a pair of diametrically opposed wing-like tab portions extending in opposite directions from a central axis, and
a hollow-core needle embedded in and extending through said hub portion along said axis,
the improvement comprising:
means including a pair of passageways extending through respective ones of said tab portions adjacent said central hub portion in parallel spaced-apart relationship to said axis for establishing hinge lines between said tab portions and said hub portion to enable said tab portions to fold about said hub portion to provide a surface for gripping said catheter needle assembly.

4,015,601
BLOOD ACCESS DEVICE

Jack C. Bokros, and Victor Slivenko, both of San Diego, Calif., assignors to General Atomic Company, San Diego, Calif.

Filed Oct. 14, 1975, Ser. No. 622,090
Int. Cl.² A61M 5/00
U.S. Cl. 128—214 R 12 Claims

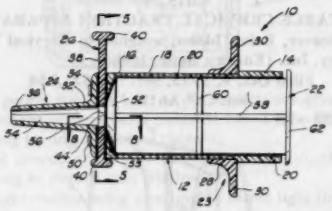


1. A device to provide access to the circulatory system of a living body comprising a tubular conduit of generally circular cross section insertable in a living blood vessel; a generally cylindrical housing having one end closed and extending transversely of and adjoining said conduit, the point of adjoining being spaced from the housing axis, said housing having fluid communication with said conduit through an aperture in a wall common to both, the perimeter defining said aperture being formed of a sharp edge of the wall, said housing having a length sufficient to extend from the blood vessel to a point outside the living body; a valve body in said housing, said valve body having therein a port alignable with said aperture, said valve body being adapted to receive a catheter in fluid communication with said port, and said valve body being coaxially rotatable in said housing between positions of alignment and non-alignment of said aperture and said port to selectively establish fluid communication between the circulatory system and a catheter inserted in said valve body; and at least all blood and tissue contacting surfaces of said device being made of a biologically compatible material.

4,015,602
EAR MOLD INJECTION DISPENSER

Eugene A. Nelson, and Woodrow R. Rice, both of Wichita, Kans., assignors to Mid-States Laboratories, Inc., Wichita, Kans.

Filed Dec. 8, 1975, Ser. No. 638,449
Int. Cl.² A61M 1/00
U.S. Cl. 128—234 6 Claims



1. An ear mold injection dispenser for receiving and mixing ear impression material therein and dispensing the material into the ear canal and the cavity of the ear, the dispenser comprising:
a tubular body having an opening in a first end portion of said body, an opening in a second end portion of said body, said body having an outer circumference and an inner circumference, the front of the second end portion of said body including outwardly extending posts integrally formed therein;
a sliding plunger received in the opening of the first end portion of said body, the sides of said plunger disposed adjacent the inner circumference of said body;
a funnel having a first end portion and a second end portion, the first end portion of said funnel including a flange portion therearound, said flange portion having apertures therethrough for receiving said posts therein in a snap fit; and
a valve slidably mounted between the first end portion of said funnel and the second end portion of said body.

4,015,603
SURGICAL DRAINAGE SYSTEM WITH PRESSURE INDICATOR

Leonard D. Kurtz, Woodmere, and Robert E. Bidwell, Melville, both of N.Y., assignors to Deknatel Inc., Queens Village, N.Y.

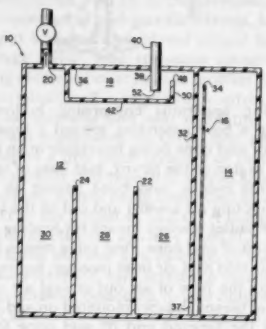
Filed Oct. 10, 1975, Ser. No. 621,600
Int. Cl.² A61M 1/00
U.S. Cl. 128—276 5 Claims

1. A surgical drainage system adapted to receive a drainage tube for the drainage of a body cavity comprising a unitary, integral structure including:
a first, gas-tight, collection compartment in fluid communication with the body cavity to be drained, said first compartment partitioned into a plurality of chambers, said collection compartment having a first port through the uppermost end of said compartment, said port adapted to receive the drainage tube so that the drainage tube extends downwardly through said port into said first compartment a distance substantially less than the height of said first compartment, said first compartment having a second port through the uppermost end of said compartment for placing said compartment in fluid communication with a source of vacuum;

an underwater seal means for forming a fluid seal at the end of the drainage tube, said seal means including a second fluid collection compartment contained within said first compartment and having a volume that is small with respect to the volume of said first compartment, said second fluid collection compartment dependent downwardly from the uppermost portion of said first compartment, the drainage tube extending into said second compartment, said second compartment having a port in fluid communication with said first compartment, said port located above the fluid seal formed in said second compartment;

a third compartment located adjacent to and having a common wall with said first collection compartment; and

a connecting passageway for connecting in fluid communi-



cation said first collection compartment and said third compartment, an opening in the lower end of said common wall between said first and third compartments in communication with the lower end of said connecting passageway, said connecting passageway being open at the upper end in communication with said third compartment so that the initial fluid drained from said port of said underwater seal means enters said first collection chamber so as to seal off said opening in said common wall and simultaneously seal off said third compartment and connecting passageway from said first compartment, the volume of said connecting passageway being small with respect to said third compartment, said connecting passageway providing visual indication of any oscillations of fluid therein caused by changes in pressure in the body cavity.

4,015,604

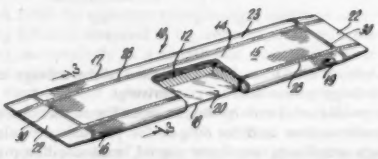
ABSORBENT PRODUCT WITH SIDE LEAKAGE CONTROL MEANS

Charles Csillag, Montreal, Canada, assignor to Personal Products Company, Milltown, N.J.

Filed Mar. 25, 1976, Ser. No. 670,509

Int. Cl.² A41B *13/02*; A61F *13/18*

U.S. Cl. 128—287 **12 Claims**



1. An absorbent product for absorbing and retaining body fluids and comprising an absorbent element of porous hydrophilic material as the absorbent medium, said absorbent element having first and second major surfaces and longitudinal side edges and transverse end edges therebetween; the improvement wherein means are provided for retarding premature failure of said product by leakage of said body fluids from said side edges while still maintaining said side edges soft and absorbent, said means comprising a narrow, longitudinally extending zone extending along each of said side edges but spaced away from each of said side edges, said longitudinally extending zone being impregnated with a hydrophobic material from major surface to major surface, the extreme marginal portions of said absorbent element along said longitudinal edges being free of said impregnation.

4,015,605

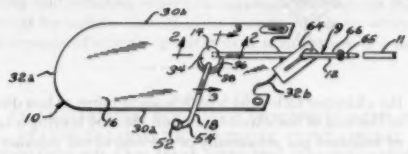
DRAINAGE RECEPTACLE

Daniel M. McWhorter, Arlington Heights, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Oct. 28, 1975, Ser. No. 626,428

Int. Cl.² A61F *5/42*

U.S. Cl. 128—294 **18 Claims**



1. A drainage receptacle, comprising:

a collection bag having a lower back wall for placement on a generally horizontal supporting surface, an upper flexible front wall having an opening extending through the front wall, and a collection chamber intermediate said front and back walls;

a connector having a base attached to said front wall around the periphery of said opening, said base having a generally planar surface defining a lowermost portion of said connector and facing toward said back wall, said connector having a cavity located only above said front wall and communicating with said chamber through said opening;

a drainage conduit communicating with the connector cavity through an inlet port spaced above said front wall opening, whereby liquid normally drains from said conduit through said opening into the chamber while the connector base is spaced from the back wall of said bag; and

a sampler conduit communicating with the connector cavity through an outlet port located at a level intermediate the inlet port and said front wall opening, whereby the base of said connector may be moved toward the back wall of the bag to prevent passage of liquid from the drainage conduit into the chamber until liquid passes into the sampler conduit for obtaining a sample.

4,015,606

METHOD AND MEANS FOR CONTROLLING THE FREEZE ZONE OF A CRYOSURGICAL PROBE

Robert K. Mitchiner, Boulder, Colo., and Wayne A. Russell, Chelmsford, Mass., assignors to Dynatech Corporation, Burlington, Mass.

Filed Sept. 9, 1975, Ser. No. 611,620

Int. Cl.² A61B *17/36*

U.S. Cl. 128—303.1 **5 Claims**

1. A cryosurgical probe comprising

A. a housing,

B. a hollow tip protruding from the housing,

C. means defining an expansion or evaporation chamber in the tip, said means including a surface isolating said chamber from said housing,

D. a refrigerant supply conduit extending through the housing and through said surface and projecting into said chamber,

E. a refrigerant exhaust conduit extending through the housing and through said surface and projecting into said chamber, said exhaust conduit terminating inside the chamber short of the supply conduit, and

F. means for conducting refrigerant to the supply conduit so that the refrigerant exhausts from the end thereof inside

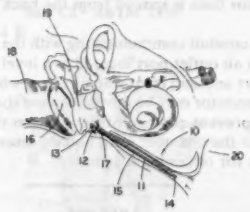
the chamber following a path leading more or less directly to the end of the exhaust conduit thereby leaving a region of stagnant gas proximally of the end of the exhaust conduit inside the chamber, said stagnant gas thereby insulating parts of the probe proximally of the end of the exhaust conduit from refrigerant flow so that they do not become cold enough to freeze human tissue.

4,015,607

EUSTACHIAN TUBE PROSTHESIS AND METHOD FOR ITS IMPLANTION

J. William Wright, III, 7763 Spring Mill Rd., Indianapolis, Ind. 46260

Filed Jan. 23, 1976, Ser. No. 651,723
Int. Cl.² A61M *27/00*; A61F *11/00*
U.S. Cl. 128—350 R **11 Claims**



1. A eustachian tube prosthesis which comprises:

a flexible tube of a material compatible with body tissue, said tube having a first end and a second end; and

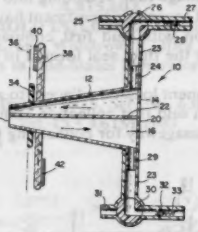
flange means mounted on said tube between said first and second ends for positioning said tube within the eustachian tube passageway of a person such that the first end is located within the middle ear cavity and the second end is located within the eustachian tube passageway, said flange means including a flexible flange of a material compatible with body tissue, the length of the tube between said flange and said second end being sufficient to span at least a major portion of the eustachian tube passageway, the flange extending generally radially from the tube, the flange being positioned not more than about 4 mm from the first end of said tube and not more than about 38 mm from the second end of said tube.

4,015,608

LARYNGECTOMY LUNG PROTECTOR

William F. Rogers, Maggie, N.C., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Oct. 8, 1975, Ser. No. 620,576
Int. Cl.² A61M *16/00*
U.S. Cl. 128—351 **3 Claims**



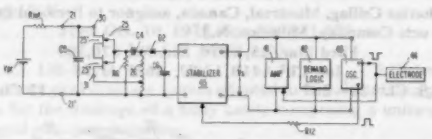
1. Breathing apparatus comprising hollow frusto-cone means having a base extending toward a tapered end, said tapered end of said cone being insertable in an opening in the throat in the region of the larynx, said base of said cone being sealed by plate means, said cone having air inlet passage means for directing air toward and out of the tapered end of said cone, air outlet passage means for leading air away from the tapered end of said cone, first valve means for controlling the flow of air into said air inlet passage, second valve means for controlling the flow of air out of said air outlet passage, adjustable seal means slidably mounted on and encircling said cone toward the tapered end of said cone for forming an adjustable seal between the outer wall of said cone and a throat opening, said first valve means comprises first check valve means for leading air into said air inlet passage and first by-pass valve means for diverting the flow of air into said air inlet passage from said first check valve or the ambient air surrounding said breathing device, said second valve means comprising second check valve means for leading air out of said air outlet passage and second by-pass valve means for diverting the flow of air from said air outlet passage to said second check valve or the ambient air surrounding said breathing device.

4,015,609

CIRCUIT FOR LOW POWER-LOW ENERGY SOURCE

Cor A. Mensink, Voorst, and Jan P. Schuimer, Dieren, both of Netherlands, assignors to Vitatron Medical B.V., Dieren, Netherlands

Filed Nov. 17, 1975, Ser. No. 632,280
Int. Cl.² A61N *1/36*; H02M *3/335*
U.S. Cl. 128—419 PG **22 Claims**



1. A circuit for DC to DC conversion of the voltage level of a low voltage power source, comprising:

a. an oscillator circuit having an input for connection to said power source and an output for providing a relatively high amplitude oscillator signal, said oscillator circuit having a low starting resistance input path connected across said source, said path containing an active circuit comprised of at least two FETs, said active circuit being characterized by having a high impedance state and a low impedance state; and

b. a rectifier circuit connected to said oscillator circuit output, for providing a rectified voltage signal from said oscillator signal.

8. A circuit for conversion of the voltage level of a low voltage power source and for providing a regulated output, comprising:

a. an oscillator circuit having an input for connection to said power source and an output for providing a relatively high amplitude oscillator signal, said oscillator circuit having a low starting resistance input path connected across said source, said path containing an active device, said device characterized by having a high impedance state and a low impedance state;

b. a rectifier circuit connected to said oscillator output, for providing a rectified voltage signal from said oscillator signal;

c. a regulator circuit with an output terminal, said regulator circuit connected to said rectifier circuit, for providing at said output terminal a regulated output from said rectified voltage signal, said regulator circuit comprising a regulating element between said rectifier circuit and said output terminal, and a regulating control path between said output terminal and said regulating element, said control path comprising an OTA, first input means for connecting to a first input terminal of said OTA a signal representative of said regulator output signal, said reference generator means being connected to a second input of said OTA, the output of said OTA being connected to said regulating element whereby said OTA acts to control said regulating element as a function of said output relative to said reference, said reference means comprising a current generator connected to said output terminal, the output of said current generator being connected both to said second OTA input terminal and into the OTA bias terminal, said current generator comprising an FET in combination with an adjustable resistor, whereby a regulated signal is provided at said regulator output terminal.

4,015,610

CIGARETTE FILTER TIP

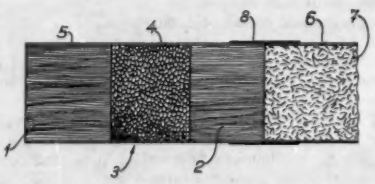
René C. Pasche, Lausanne, Switzerland, assignor to Baumgartner Papiers S.A., Switzerland

Continuation-in-part of Ser. No. 537,766, Dec. 31, 1974, abandoned. This application Feb. 6, 1976, Ser. No. 655,980

Claims priority, application Switzerland, Feb. 4, 1974, 1472/74

Int. Cl.² A24B *15/02*

U.S. Cl. 131—9 **4 Claims**



1. A filter tip cigarette comprising a cigarette section comprising tobacco wrapped in cigarette paper, a tip section comprising successively in a lengthwise direction a first fibrous filter element, a granular filter element and a second fibrous filter element and a transparent tubular casing holding said filter elements together in a unitary structure, said tip section being assembled in end-to-end relation with said cigarette section, and a band of joining paper wrapper around adjacent portions of said cigarette section and said tip section to join said cigarette section and tip section together, said joining paper extending only around a portion of one of said fibrous filter elements of said tip section, thus leaving said granular filter element wholly visible, said granular filter element comprising material which changes color by reaction of noxious components in smoke produced by combustion of said tobacco, said material which changes color comprising an inorganic iron sulfate which is transformed into an iron sulfide by reaction with hydrogensulfide in the cigarette smoke.

4,015,611

CIGARETTE FILTER

Arno Holst, Wiesbaden-Biebrich; Michael Kostrzewa, Wiesbaden, and Helmut Lask, Wiesbaden-Schierstein, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Mar. 26, 1975, Ser. No. 562,143

Claims priority, application Switzerland, Mar. 28, 1974, 4300/74

Int. Cl.² A24C *5/50*

U.S. Cl. 131—268 **2 Claims**

1. A cigarette filter of cellulosic material composed at least partially of a cellulose ether prepared by etherifying it to a virtually completely water-soluble cellulose ether and cross-linking said cellulose ether to a degree such that more than 50 percent by weight thereof is no longer soluble in water, but still capable of absorbing water to at least its own dry weight.

4,015,612

FILM-FORMING POLYMER MODIFIED WITH A FLUOROALIPHATIC RADICAL CONTAINING COMPOUND AND HAIR STYLING COMPOSITION THEREOF

Frank J. Pavlik, St. Paul, and Robert L. Hansen, Roseville, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 758,630, Sept. 9, 1968, abandoned. This application Apr. 26, 1974, Ser. No. 464,491

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² A45D *7/00*; A61K *7/11*

U.S. Cl. 132—7 **7 Claims**

1. A method of styling hair comprising combing and styling hair into a desired configuration and applying to the thus configured hair a liquid hair styling composition capable of holding hair in place under humid and windy conditions while imparting a soft hand and sheen to the hair and which is easily removed by shampooing comprising a polymer solvent and in combination therewith a fluoroaliphatic radical containing modified film-forming polymer, said fluoroaliphatic radical being a fluorinated saturated monovalent nonaromatic radical containing from 3 to 20 carbon atoms, in which the carbon atoms of the chain are substituted only by fluorine, chlorine or hydrogen atoms with no more then one hydrogen or chlorine atom for every two carbon atoms, and in which a divalent oxygen or trivalent nitrogen atom, bonded only to carbon atoms, can be present in the aliphatic chain, said polymer being a linear polar polymer having a specific viscosity in one percent solution in methyl ethyl ketone at 25°C. of at least 0.05, having pendant fluoroaliphatic groups contributing 0.5 to 15 percent by weight fluorine to the polymer, said polymer also containing between five and 22 percent by weight pendant carboxyl groups.

4,015,613

TANK CLEANING APPARATUS

Charles A. Papworth, 1018 SW. 21st St., Ft. Lauderdale, Fla. 33315

Filed Oct. 17, 1975, Ser. No. 623,438

Int. Cl.² B08B *3/02*, *9/08*

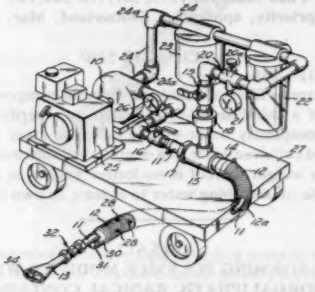
U.S. Cl. 134—102 **27 Claims**

1. In an apparatus for cleaning a tank which is at least partly full of liquid, said apparatus comprising a pump for withdrawing liquid from the tank and pumping it back into the tank, filter means for filtering the liquid withdrawn from the tank before the liquid is returned to the tank, and a unitary flexible hose assembly comprising an outer hose and an inner hose

extending along the inside of the outer hose and defining therewith a return passageway for liquid withdrawn from the tank, the improvement wherein:

said outer hose has an inlet opening at its lower end for insertion into the tank to be cleaned and having its upper end operatively connected to the inlet side of the pump to pass thereto the liquid withdrawn from the tank,

said inner hose is operatively connected at its upper end to the outlet side of the pump for passing liquid therefrom under pressure through the interior of the inner hose back into the tank,



said inner hose has discharge means on its lower end projecting beyond said lower end of said outer hose and having a discharge opening for discharging liquid under pressure from the inner hose into the tank to agitate the contents of the tank for withdrawal through said outer hose,

and said pump is operatively connected to said inner and outer hoses to pump the liquid withdrawn through the outer hose in a continuous recirculating flow back into the inner hose substantially immediately without intermediate storage of the liquid.

4,015,614

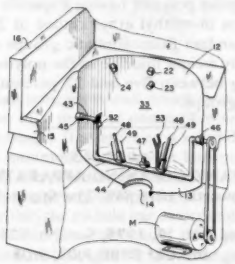
APPARATUS FOR WASHING SANITARY CONVENIENCES SUCH AS BED PANS AND THE LIKE

Arne Ingvar Jönsson, Getinge; Olov Valdemar Malmström, Halmstad, and Bengt Gunnar Julius Tibell, Eskilstuna, all of Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden

Continuation of Ser. No. 437,622, Jan. 29, 1974, abandoned. This application Aug. 14, 1975, Ser. No. 604,726

Int. Cl.[2] B08B *3/00, 9/00*

U.S. Cl. 134—152 **3 Claims**



1. Apparatus for washing bed pans and similar articles comprising a housing provided with a chamber, a cover for said chamber, a liquid supply, a plurality of nozzles mounted on the wall of said chamber and connected to said liquid supply whereby the wall of said chamber as well as the exterior surfaces of said articles are sprayed with liquid, a crank-shaped pipe being rotatably journalled in and extending across said chamber, motor means for slowly rotating said pipe, and said pipe being positioned in a generally horizontal plane and having at least one ejector nozzle and means for conducting liquid thereto, said pipe additionally being provided with at least one holder for holding said articles, both said ejector nozzle and said holder being mounted on said crank-shaped pipe, said articles removably held on said crank-shaped being pipe while being sprayed internally with liquid that passes through said pipe by said holders and said ejector nozzle, and one of said nozzles having a central bore for the liquid supply and a connecting channel located substantially transverse thereto, a relatively wide cut-out passage located at an angle with respect to the wall of the chamber and joined to said connecting channel for conducting the liquid supply from said connecting channel through said cut-out passage in the form of a liquid spray whereby the wall of the washing chamber is sprayed with a liquid curtain that covers approximately an angle of 180°.

4,015,615

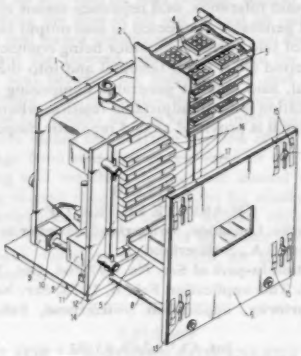
FLUID APPLICATION SYSTEM

Jorn-Olaf Christian Weber, Wappingers Falls, and Carl Yakubowski, Hyde Park, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 13, 1975, Ser. No. 586,769

Int. Cl.[2] B08B *3/02*

U.S. Cl. 134—196 **6 Claims**



1. Apparatus for fluid application to a plurality of substantially planar objects comprising:

carriers for said planar objects;

means for supporting said carriers in a vertical array attached to the door of said apparatus;

a chamber having a like number of agitation mechanisms to the number of said carriers;

said agitation mechanisms being positioned in said chamber in a vertical array so that when said door is closed said agitation mechanisms fit interleaved to, and above and parallel to the plane of said carriers;

each of said mechanisms include an orificed plate positioned on one side of each of said carriers; and

means for moving fluid through said orificed plate with a pulsating motion.

4,015,616

AUTOMATIC WATERING DEVICE

Ludovic F. Hanff, 6243 Evergreen Ave., North, Seminole, Fla. 33542

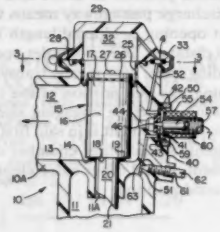
Filed Aug. 25, 1975, Ser. No. 607,115

Int. Cl.[2] A01G *25/00*

U.S. Cl. 137—78 **4 Claims**

1. A moisture sensitive hydroelectrical switch comprising a

hollow body having an inlet end, an outlet end, and a dry chamber, an electrical switch, having electrical conduits provided with switch contacts, fastened in said dry chamber, a fluid tight pressure gland, having a medial passageway, rotatively connected to said hollow body at said outlet end with said electrical conduits passing through said medial passageway, a body extension having a hollow core fastened to the inlet end of said hollow body, an adjustable sleeve, provided with an axial passageway, rotatively connected to said body



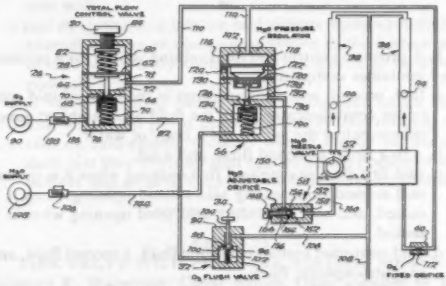
extension, a rod having a head, fabricated from waterproof electrical insulation, slidably mounted in said axial passageway, a peg, fabricated from electrical insulated material, fastened in said head, a hollow sleeve, fabricated from resilient material, interposed between said adjustable sleeve and said head to urge said peg against said switch contacts, a plurality of collars, fabricated from moisture sensitive material, which expands when wet and contracts when drying, fastened to said rod to move said peg toward and away from said switch contacts to open and close said electrical switch.

4,015,617

ANALGESIC APPARATUS

Edward A. Connolly, Williamsville, N.Y., assignor to Fraser Sweatman, Inc., Lancaster, N.Y.

Filed Mar. 25, 1975, Ser. No. 561,906
Int. Cl.² G05D *11/03*
U.S. Cl. 137—88 **8 Claims**



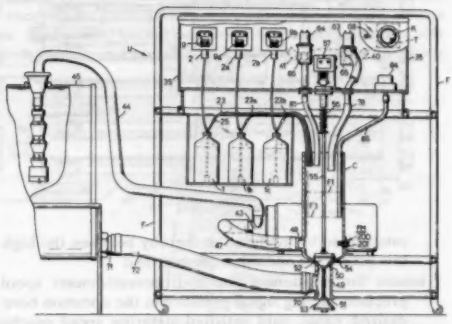
1. Analgesic apparatus comprising at least two flowmeters; means for supplying one fluid component to one of said flowmeters; means for supplying a second fluid component to another of said flowmeters; fixed orifice means having a permanently restricted passage for determining the maximum rate of flow of said one component; pre-setting means for determining the maximum rate of flow of said second component thereby to establish maximum relative proportions of said components entering said flowmeters, the position of said pre-setting means being set prior to normal use of said apparatus so as to eliminate the necessity for any adjustment thereof during normal use of said apparatus; control means for varying the rate of flow of said second component independently of the rate of flow of said one component during use of said apparatus in order to selectively vary the relative proportions of said components up to said maximum relative proportions and flow control means operable to selectively vary the total rate of flow of said fluid components substantially without varying the relative proportion thereof.

4,015,618

APPARATUS FOR AUTOMATICALLY MIXING AND CIRCULATING CLEANING SOLUTIONS THROUGH DAIRY EQUIPMENT

Rolyn A. Schmid, Hayward, Wis., assignor to Bender Machine Works, Inc., Hayward, Wis.

Filed Nov. 24, 1975, Ser. No. 634,876
Int. Cl.² G05D *11/08*; B08B *9/08*
U.S. Cl. 137—93 **22 Claims**



1. In apparatus for mixing a cleaning solution of predetermined pH value for circulation through dairy equipment, in combination:

a container having a cleaning ingredient therein;

a mixing receptacle having a solvent therein;

a pump for supplying said cleaning ingredient from said container to said mixing receptacle for mixture with said solvent to form said cleaning solution; and

control means, said control means including timing means to effect activation of said pump for a predetermined interval of time,

said control means further including means for sensing the pH value of the said cleaning solution as said cleaning ingredient is being supplied to said mixing receptacle by said pump and for effecting deactivation of said pump when a predetermined pH value is reached and before expiration of said predetermined interval of time.

4,015,619

CLUTCH-BRAKE STEERING MECHANISM FOR TRACTORS

Daniel B. Shore, Niles, and Probir K. Chatterjea, Mount Prospect, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Mar. 24, 1975, Ser. No. 561,119
Int. Cl.² F15B *13/06*
U.S. Cl. 137—102 **5 Claims**

1. For use in a fluid pressure system including high pressure, low pressure, and inlet-outlet conduits:

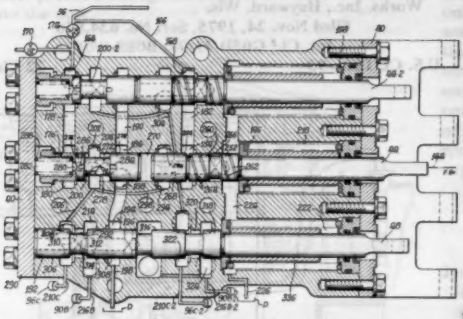
signal-pressure setting valve assembly means with a common bore therein hydraulically disposed for communicating with said conduits and controllably connecting the high and low pressure conduits for producing an actual inlet-outlet pressure in the inlet-outlet conduit in correspondence with a signal pressure as set;

said assembly means comprising independently slideable, hydropotentiometer and satisfied-metering spools in the common bore for establishing the signal and actual pressures, said satisfied-metering spool communicating at its opposite ends with the signal and actual pressures in the bore in such way that the established pressure on the hydraulic fluid at intervening points between adjacent

ends of the hydropotentiometer and satisfied-metering spools is the signal pressure;

said hydropotentiometer spool being of an elongated shape so as to vary the signal pressure established thereby between the high and low pressure conduits from a maximum to a minimum at successive points proportionately along its length;

said satisfied-metering spool controlling the inlet-outlet conduit and varying, in said conduit, said actual pressure



established by modulation thereby between the high and low pressure conduits aforesaid; and

means for positioning the hydropotentiometer spool for precisely setting signal pressure in the common bore to a desired value, said satisfied-metering spool reaching a satisfied position when the force on that end of the spool which is exposed to signal pressure set in the bore by the hydropotentiometer spool is balanced by the force on the metering spool end exposed to the actual pressure in the bore.

4,015,620

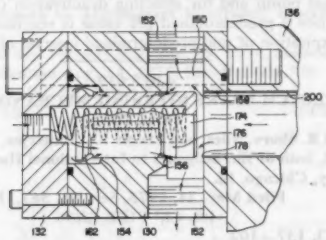
HIGH RESPONSE UNLOADING VALVE

Louis F. Carrieri, LaGrange Park, Ill., assignor to Gulf & Western Manufacturing Company, Southfield, Mich.

Filed Oct. 11, 1974, Ser. No. 514,106

Int. Cl.² F16K *11/00*

U.S. Cl. 137—115 **13 Claims**



12. A hydraulic fluid pressure relief valve comprising a housing, a pair of fluid receiving chambers in said housing, discharge passageway means in said housing for said chambers, each of said chambers having an inlet opening and an outlet opening, said outlet openings being in fluid flow communication with said discharge passageway means, fluid pressure actuated valve elements each coaxial with a corresponding one of said outlet openings, means interconnecting said valve elements for displacement simultaneously between first and second positions, each of said valve elements having an end portion cooperable with the corresponding outlet opening in said first and second positions to respectively close and open the corresponding chamber with respect to said discharge passageway means, said valve elements being displaceable from said first position toward said second position by fluid in one of said chambers at a pressure exceeding a given pressure, said valve elements being biased toward said first position by fluid in the other chamber at said given pressure, said outlet opening of said one chamber including a cylindrical wall having an axially outer edge, the end portion of the corresponding one of said valve elements including cylindrical head means engaging an axial length of said wall from said edge when said one valve element is in said first position, said one valve element moving a given axial distance from said first toward said second position to cause said other chamber to open to said discharge passageway means through the corresponding outlet opening, said axial length being greater than said given axial distance, and said outlet opening of said other chamber including valve seat means transverse to the axis of the latter opening, the end portion of the other of said valve elements including a surface engaging said seat means only when said other valve element is in said first position, whereby said outlet opening of said other chamber opens immediately upon displacement of said other valve element from said first toward said second position.

4,015,621

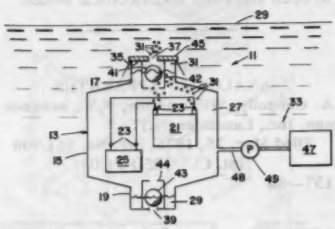
PRESSURE CONTROL AND FLUID VENTING SYSTEM FOR A PRESSURIZED CONTAINER

Darryl E. Laxo, Novato, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 18, 1976, Ser. No. 667,914

Int. Cl.² F16K *24/00*

U.S. Cl. 137—173 **7 Claims**



1. A pressure control and fluid venting system for a pressurized container comprising:

a. first, second, and third openings in the walls of said container communicating with the fluid of an ambient atmosphere below the surface of a body of water;

b. a first float, a second float, and a lid;

c. said first float sealing said first opening when it is seated, said second float sealing said second opening when it is seated, and said lid sealing said third opening when it is seated;

d. said container containing a first fluid, a second fluid, and said atmospheric fluid;

e. said first fluid having a density less than either the density of said second fluid or said atmospheric fluid and said second fluid having a density less than that of said atmospheric fluid;

f. said first float having a density greater than said first fluid and less than said second fluid, and said second float having a density greater than said second fluid and less than said atmospheric fluid;

g. said lid weight being sufficient to keep said lid seated unless the pressure in said container exceeds the local pressure of said ambient atmosphere by a predeterminable value; whereby

h. when the level of said second fluid drops below a given level, said first float unseats and allows the venting of said first fluid; when the level of said atmospheric fluid reaches a given level, said second float unseats and allows

the venting of said atmospheric fluid; when the internal pressure of said container exceeds the local pressure of said ambient atmosphere by an amount which approaches a value which would rupture said container, said lid unseats and allows the relief of said pressure; and when the local pressure of said ambient atmosphere exceeds the internal pressure of said container by an amount which approaches a value which would crush said container, said first float and said second float unseat to permit the entry of said atmospheric fluid to equalize the pressures.

4,015,622

VALVE FOR USE WITH INFLATABLE ARTICLES SUCH AS PNEUMATIC BOATS

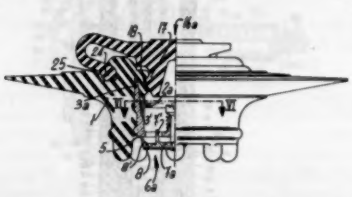
Ezio Pagani, Bergamo, Italy, assignor to National Distillers and Chemical Corporation, New York, N.Y.

Filed Nov. 19, 1975, Ser. No. 633,353

Claims priority, application Italy, Nov. 22, 1974, 29726/74; May 30, 1975, 23875/75

Int. Cl.² F16K *15/20*

U.S. Cl. 137—223 **5 Claims**



1. A valve for use with an inflatable article, said valve comprising

a hollow cylindrical valve body;

a closure member adapted to seat against the bottom wall of said valve body, said closure member including a cap and a pin, having a head, secured to said cap;

a hub formed as part of the bottom wall of said valve body, and a spring disposed between said hub and said head such that said closure member is urged against said bottom wall;

a pair of upstanding tabs on said closure member normally extending through openings provided in the bottom wall of said valve body such that said valve is in its closed position;

said valve including means for deflating said article such that when said pin is pressed inwardly and rotated, the tabs on said closure member will be moved sufficiently such that they will then abut against a solid portion of said bottom wall so as to keep said valve in the open position.

4,015,623

TIRE VALVE WITH PRESSURE RELEASE MEANS

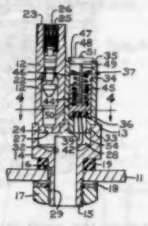
Gregory E. Wanstreet, Canal Fulton, Ohio, assignor to The B.F. Goodrich Company, Akron, Ohio

Continuation of Ser. No. 412,627, Nov. 5, 1973, abandoned. This application Aug. 27, 1975, Ser. No. 608,060

Int. Cl.² F16K *15/20*

U.S. Cl. 137—224 **2 Claims**

1. An inflating and pressure relieving tire valve assembly for use on a tire rim of a tire wheel assembly comprising an elongated valve body having a first portion attachment means; said valve body having a pair of adjoining contiguous outwardly extending parallel open ended cylindrical portions, one being long and one short relative to each other; a chamber within said body closely adjacent to the said first portion; a tire connecting passage for communicating an inflating medium from said chamber; an inflating passage in the long one of said cylindrical portions joining said open end with said chamber and having a valve core therein for communicating an inflating medium from a source of fluid pressure to said chamber; a pressure relief passage in the short one of said adjoining cylindrical portions joining said open end with said chamber; said pressure relief passage having a pressure exhaust port at one open end and a pressure release port at the other end providing fluid communication between said chamber and said exhaust port at one end of said relief passage to release excess inflating medium through said exhaust port to the atmosphere; the cross-sectional area of said inflating passage being less than the cross-sectional area of said relief port; a pressure release valve mechanism in said pressure relief passage operative to control flow of fluid therethrough; pressure responsive means operative to close said valve mechanism at fluid pressures in said chamber less than a predetermined pressure and open said valve mechanism when fluid pressures in said chamber exceed said predetermined pressure; said pressure release valve mechanism comprising a piston closely reciprocably received within said pressure relief passage; said piston having



recesses along the outer periphery for directing the flow of fluid thereby from said chamber to said exhaust port; said piston being an elongated cylindrically shaped member with a cup-shaped centrally disposed bore; said elongated piston mounted for linear movement in said pressure relief passage; valve seat means at the end of said pressure relief port having a diameter that is less than the effective diameter of said piston; sealing means on one end of said piston to sealingly engage said valve seat; a press fit star washer in said pressure relief passage; spring means seated in said bore of said piston and extending outwardly therefrom engaging said star washer for biasing said piston toward said valve seat to close said pressure relief passage from communicating with said chamber; and an exhaust port dust cover and indicator means operatively interconnected by rod means with said valve mechanism to close said exhaust port when said valve mechanism is closed and open said exhaust port when said valve mechanism is open.

4,015,624

TIRE VALVE

Gregory E. Wanstreet, Canal Fulton, and C. Lucas Plaat, Troy, both of Ohio, assignors to The B.F. Goodrich Company, Akron, Ohio

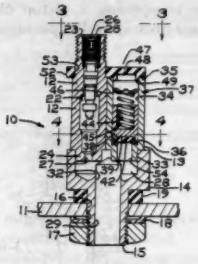
Continuation of Ser. No. 407,920, Oct. 19, 1973, abandoned. This application Aug. 27, 1975, Ser. No. 608,061

Int. Cl.² F16K *15/20*

U.S. Cl. 137—224 **1 Claim**

1. Valve means for a pneumatic tubeless tire mounted upon a vehicle wheel rim, said valve means comprising an elongated body provided with means on one end for securing the body in operating position, the said body having a chamber therein disposed adjacent the said one end with a first passageway in communication with and extending from one side of said chamber through the said one end of said body, said chamber communicating with a pair of parallel generally cylindrical passageways, said parallel passageways in communication with and extending from the opposite side of said chamber through the opposite end of said body, a valve core in one of said pair of passageways permitting fluid under pressure to be introduced or exhausted therethrough, a valve seat of lesser

diameter than the internal diameter of said other of the pair of passageways surrounding the communating opening between the latter passageway and said chamber, a cylindrical piston slidably in the said other pair of passageways with one end of said piston for abuttingly contacting said valve seat in fluid sealingly relationship, a compression spring disposed in said other of said pair of passageways with one end of the spring disposed in an axial bore provided in the other end of said piston, a perforate member engaging the other end of said spring, said perforate member having peripheral portions gripping the sidewall of the passageway in which the spring is located for retaining said perforate member at a selected position and thereby provide a pre-selected compression of said spring, said piston having fluid passageways axially thereof radially outwardly of the end area which sealingly



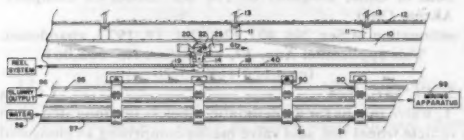
engages said valve seat, the cross-sectional area available for fluid passage into said chamber from said one of said pair of passageways being less than that for exhaust of fluid from said chamber through the other of said pair of passageways when the piston is displaced from said valve seat, an imperforate flexible dust cap means normally closing said other of said pair of passageways at the end thereof opposite said chamber, said dust cap means being displaceable by fluid under pressure exiting from said chamber when said piston is displaced from said valve seat, means for retaining said flexible dust cap means upon said body in said displaced condition to indicate a release of pressure, said cap means and retaining means are formed integrally of resilient deformable material with a part thereof frictionally held in the outer end of said other of said pair of passageways and a further part embracing an external portion of said body.

4,015,625

HYDRAULIC MATERIALS HANDLING SYSTEM

Danrick W. Alexander, Fairmont, W. Va., assignor to Continental Oil Company, Ponca City, Okla.

Filed Dec. 29, 1975, Ser. No. 644,354
Int. Cl.² F16L *3/00*
U.S. Cl. 137—355.2 **5 Claims**



1. In an overhead support apparatus for a slurry hose transportation system which includes a rail member anchored to a support means a predetermined distance above the floor, a plurality of spaced roller means movably engaged with and supported by said rail member and slurry hose means for attachment to said plurality of spaced roller means, a rigid beam support system comprising:

a. at least one beam, each said beam having first and second ends;

b. means for pivotally attaching each said beam intermediate said ends to a corresponding one of said plurality of spaced roller means; and

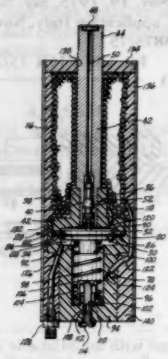
c. a plurality of slurry hose clamping means for pivotally attaching said slurry hose means to each of said beams; said rigid beam support system being so constructed and arranged that said at least one beam supports said slurry hose means above the floor and substantially parallel to the floor when in storage and, alternately, when in use.

4,015,626

CONSTANT FLOW VALVE FOR LOW FLOW RATES

Petur Thordarson, Seattle, Wash., assignor to Thordarson, Inc., Seattle, Wash.

Filed Jan. 22, 1976, Ser. No. 651,360
Int. Cl.² F16L *7/00*
U.S. Cl. 137—375 **9 Claims**



1. A constant flow valve for use in relatively low flow rate systems, comprising:

housing means defining an internal cavity;

movable wall means within said housing means, dividing said cavity into upstream and downstream chambers;

means defining an elongated fluid passageway extending perpendicularly of said movable wall means and having an upstream inlet end connectible with a source of fluid under pressure and a downstream end in communication with said upstream chamber;

means defining a control orifice within said elongated fluid passageway;

means for varying the size of said control orifice including an elongated control stem within said elongated fluid passageway extending downstream from said control orifice also perpendicularly of said movable wall means, said control stem having a downstream end in contact with said movable wall means and a valve plug at its upstream end operable to increase the size of said control orifice when the control stem is moved upstream and to decrease the size of said control orifice when the control stem is moved downstream;

a substantial length of relatively small internal diameter, high flow resistance tubing coiled about at least a portion of the means defining said elongated fluid passageway, said tubing having an inlet communicating with said upstream chamber and an outlet communicating with said downstream chamber, said tubing providing a small diameter fluid passageway extending from the upstream chamber to the downstream chamber and performing the dual functions of a pressure reducing restriction between the two chambers and a flow rate averager, so that a substantially true constant flow rate emits from said tubing;

bias means within said downstream chamber for urging the movable wall against the control stem in the upstream direction an amount resulting in the control orifice normally being partially open, with pressure variations be-

tween the two chambers serving to move said movable wall and said control stem, to increase or decrease the size of the control orifice, so that the flow rate through the control orifice and into the tubing is averageable to a substantially true constant flow rate; and

outlet passageway means of fixed size leading from the downstream chamber, outwardly from said constant flow valve.

4,015,627

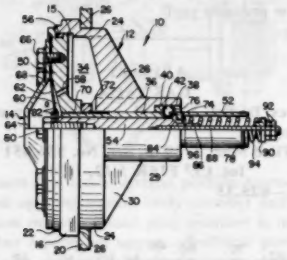
PRESSURE RELIEF VALVE

Allen M. Bower, Painsville, Ohio, assignor to Emco Wheaton Inc., Conneaut, Ohio

Filed May 9, 1975, Ser. No. 575,871

Int. Cl.² F16K *31/126*

U.S. Cl. 137—494 **2 Claims**



1. A pressure relief valve comprising: a housing having an inner end and an outer end, said housing being mountable in a wall of a pressure vessel with the inner end exposed to the interior of the vessel and the outer end exposed to the exterior of the vessel, a pressure relief passage opening through said housing between said inner end and said outer end through which the interior of a vessel may be vented, a valve seat in said pressure relief passage, a valve member slidably mounted in said housing, said valve member including a valve head adpated to engage said valve seat when in a first position to close said through passage, said valve member being mounted for movement between said first position and a second position in which the pressure relief passage is open to permit full flow therethrough, lock means for releasably interlocking said valve member and said housing to retain said valve member in said first position, pressure responsive lock release means mounted on said valve member and movable in response to an increase in pressure, at said inner end of said housing, above a predetermined minimum pressure, to release said lock means to free said valve member with respect to said housing and thereby permit said valve member to move freely to said second position without any further significant increase in pressure at said inner end of said valve, said housing having a stem passage opening therethrough, said stem passage having a radially outwardly extending recess formed therein, said valve member including a valve stem slidably mounted in said stem passage, a lock release passage extending longitudinally of said stem, a locking passage extending radially through said valve stem, said lock means being mounted for movement in said locking passage between a locking position projecting from said stem into said recess of said housing to interlock said valve member with respect to said housing when said valve member is in said first position and a release position in which it is inwardly withdrawn from said recess to release said valve with respect to said housing, said lock release passage communicating with said locking passage means, said pressure responsive lock release means including; a lock release shaft mounted for movement in said lock release passage between a first position in which said lock means is retained in said locking position projecting into said recess and a second position in which said lock release shaft is spaced from said recess such that said lock means is free to withdraw to said release position, and a pressure sensitive diaphragm mounted on said valve member and connected to said lock release shaft to move said shaft between the first and second positions in response to pressure variations as required, and return spring means extending between said lock release shaft and said valve stem normally urging said lock release shaft to said first position with respect to said valve stem.

4,015,628

DILUTION DEVICE

Ellwood A. Randolph, 680 Sharp Lane, Baton Rouge, La. 70815

Filed Dec. 12, 1975, Ser. No. 640,203

Int. Cl.² B01F *3/08*

U.S. Cl. 137—566 **9 Claims**

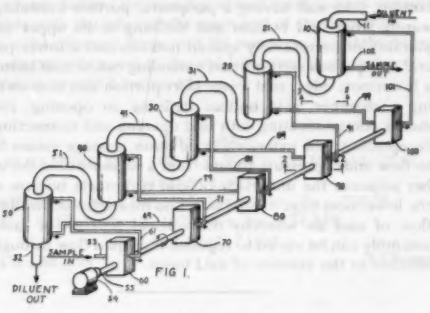


FIG 1.

1. In combination, apparatus for the controlled dilution with a preselected amount of fluid diluent, of a sample comprised of a particulate solids containing fluid comprising

a plurality of vessels serially connected one to another, wherein the total of a diluent stream can be introduced into a first vessel to flow from one preceding vessel to the next of the series, the total diluent passing from the diluent entry side of a vessel and egressing from the diluent exit side of said vessel, and egressing finally from the diluent exit side of the last vessel of the series, as determined by the direction of flow of the diluent,

means for the introduction of a sample comprising a particulate solids containing fluid into the diluent entry side of the last vessel of the series, the particulate solids containing fluid and diluent being thoroughly admixed one with the other to form a homogeneous mixture,

means associated with each adjacent pair of the serially connected vessels for withdrawal of the total of the fluid effluent from the diluent exit side of a downstream vessel, and for reintroduction of the total of the fluid effluent (fluid) into the diluent entry side of the upstream vessel of the associated pair of vessels, the particulate solids containing fluid and diluent being thoroughly admixed one with the other in each of the vessels to form a homogeneous mixture, and

means for withdrawal of a diluted sample from the diluent exit side of the first vessel of the series,

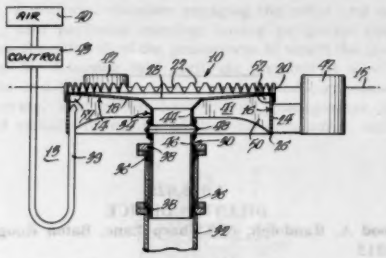
whereby a sample of a particulate solids containing fluid of relatively high solids concentration can be introduced into the last vessel of the series, and the diluted sample discharged from the first vessel of the series.

4,015,629

ADJUSTABLE FLOW FLOATING WEIR ASSEMBLY

Thomas H. Morgan, P.O. Box 10604, Jackson, Miss. 39209, and Wayne S. Posey, P.O. Box 1556, Forest, Miss. 39074

Filed Sept. 15, 1975, Ser. No. 613,284
Int. Cl.² G01F *11/00*; E03B *11/00*
U.S. Cl. 137—578 **9 Claims**



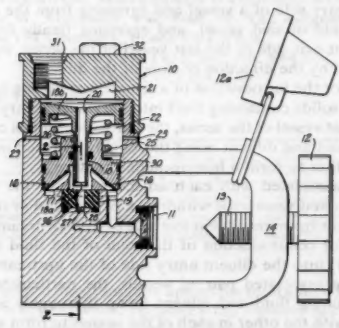
1. An adjustable-flow floating weir assembly in a liquid-containing basin for regulating the flow of liquid out of said basin, comprising: a receptacle including a peripheral wall and a bottom, said wall having a peripheral portion extending upwardly from said bottom and defining at its upper edge a plurality of peripherally spaced notches and a lower peripheral non-porous skirt portion extending below said bottom to a lowermost edge, said lower skirt portion and bottom defining a chamber, said bottom defining an opening, conduit means communicating with said opening and connecting said receptacle to the exterior of said basin, passage means for air to flow under pressure to and from a region within the chamber adjacent the underside of said receptacle bottom above the lowermost edge of said skirt and means for controlling the flow of said air whereby the vertical position of said weir assembly can be varied to regulate the liquid flow through said notches to the exterior of said basin.

4,015,630

REGULATOR FIRST STAGE FOR UNDERWATER DIVING

Boris L. Contreras, Huntington Park, Calif., assignor to Pittman Products, Inc., Huntington Park, Calif.

Filed Oct. 23, 1975, Ser. No. 625,065
Int. Cl.² F16K *31/12*
U.S. Cl. 137—505.25 **3 Claims**



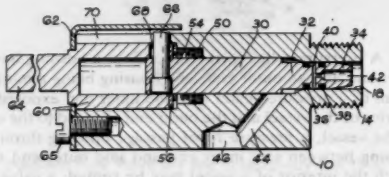
1. A regulator first stage for underwater diving comprising a regulator body, said body having a high pressure inlet connected to a high pressure chamber, a low pressure chamber having at least one low pressure port connected thereto, a piston mounted for reciprocal movement within said regulator, a passage extending longitudinally through said piston and connecting said high pressure chamber to said low pressure chamber, a high pressure port connected to said high pressure chamber and disposed at the end of said regulator body adjacent to said high pressure chamber, a valve seat for engaging the end of said piston to close off said passage, an opening extending through said valve seat in alignment with the passage extending through said piston, an additional low pressure port formed in said regulator body, passage means extending through said regulator body and connecting said additional low pressure port to said opening in said valve seat, whereby said additional low pressure port is connected to said low pressure chamber through said passage in said piston, at least a portion of the flow path between the end of said piston and said additional low pressure port being of smaller cross-sectional diameter than the passage through said piston, whereby the rate of flow to said vest is less than the rate of flow through the conventional low pressure port of said regulator, and means for removably connecting a vest inflator hose to said additional low pressure port.

4,015,631

GAS TAPS

Stephen Hayes, Dudley, England, assignor to Ewarts Limited, Dudley, England

Filed Mar. 7, 1975, Ser. No. 556,451
Int. Cl.² F16K *1/12*, *1/34*
U.S. Cl. 137—625.33 **11 Claims**



1. A gas tap comprising a body provided with a flow passage including successive sections of differing diameter, a plunger which has a tapered nose portion and is mounted for axial movement along said flow passage to control the flow rate of gas through said passage, and an O-ring carried by the plunger and encircling the same at a position adjacent the tapered nose portion, the plunger being movable, from a closed position in which the tapered nose portion is received within the smaller diameter section of the flow passage and the O-ring is located wholly within and sealingly engages the wall of said smaller diameter section, to an open position in which the nose portion extends into the smaller diameter section and the O-ring is located within the larger diameter section, the plunger being provided with a formation extending from the tip of said nose portion towards the O-ring, which formation affords communication between said successive flow passage sections when the plunger is in said open position, and is constituted by a passageway formed in the plunger, said passageway opening at the tip of said nose portion and also at a point on the periphery of the plunger between the O-ring and the tip of the nose portion.

4,015,632

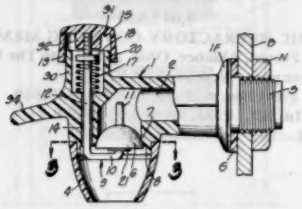
VALVE CONSTRUCTION

Carl E. Frahm, and Shirley E. Frahm, both of 1428 Oak Meadow Road, Arcadia, Calif. 91106

Filed Aug. 18, 1975, Ser. No. 605,431
Int. Cl.² F16K *1/32*
U.S. Cl. 137—801 **1 Claim**

1. A spigot comprising: a body member with an orifice at the end thereof, a plug member, and means for moving said plug member between a first position against said orifice in sealing relation therewith a second position spaced from said

orifice to permit fluid flow therethrough, a nozzle, means attachably mounting said nozzle on said body member in communication with said orifice to control fluid flow from said orifice, said nozzle when mounted on said body member extending around said plug member to prevent access to said plug member, said plug member moving means being mounted exclusively in said body member such that said nozzle may be attached without engagement with said plug member moving means, a thumb piece, said plug member actuating means extending beyond said body member and terminating in said thumb piece engageable by a person's thumb, a projection extending from such body member engageable by a person's finger when simultaneously the person's thumb engages said thumb piece, said plug member moving means including



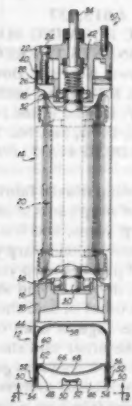
a wire element that has a vertical portion extending through an elongated opening in said body member and a bent horizontal portion on which said plug member is mounted, said body member having an upper cylindrical portion through which said wire element extends, said wire element having a threaded portion in its upper end, a coil compression spring within said cylindrical portion and having one of its ends engaging said body member, a nut on said threaded portion engaging the other end of said spring, said thumb piece having a threaded portion engaging said threaded portion of said wire element, said thumb piece having a cylindrical skirt portion encircling said body cylindrical portion, and said thumb piece having a portion engageable with said body cylindrical portion engageable with said body cylindrical portion to limit movement of said thumb piece.

4,015,633

ASSEMBLY FOR SEALING AND PRESSURE EQUALIZATION OF A SUBMERSIBLE HOUSING

Ronald D. Mandell, Elkhorn, Wis., assignor to Sta-Rite Industries, Inc., Delavan, Wis.

Filed Oct. 17, 1975, Ser. No. 623,499
Int. Cl.² F16L *55/10*; B65D *7/42*
U.S. Cl. 138—89 **8 Claims**



1. An assembly for sealing and pressure equalization of a submersible, fluid-filled device, said assembly comprising:

a housing with a generally circular cylindrical wall defining an open end;

a sheet metal retaining member including a cylindrical band portion having a circular cylindrical shape complementary to the shape of the housing end wall;

an imperforate, generally cup-shaped diaphragm having an end wall and having a circular cylindrical side wall complementary in shape to said band portion;

said housing wall and said band member defining a circular cylindrical annular space therebetween;

the side wall of said diaphragm sandwiched in said space between said band member and said housing wall and pressed into sealing engagement with said housing wall by said band member;

recess means defined in a circle circumscribing said housing wall spaced from the open end of the housing wall;

a plurality of locking tabs integral with said sheet metal retaining member and disposed in a circular array on said band portion;

said tabs sloping and extending radially outwardly from said band;

said tabs bein resiliently compressed inwardly upon insertion of said retaining member into the housing, and expanding into said recess means to prevent withdrawal of said retaining member from the housing; and

lip means defined on the edge of said band portion engageable with the edge of the open end of the housing;

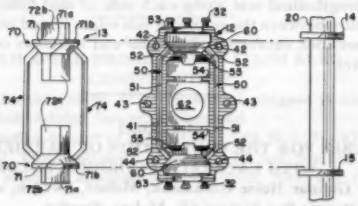
the axial distance from said lip means to said tabs being substantially equal to the axial distance from said recess means to said housing edge.

4,015,634

SPLIT-SLEEVE PIPE DEVICE WITH INTEGRAL SEAL AND INSULATOR

Joe William Christie, P.O. Box 386, Frisco, Tex. 75034

Filed May 2, 1975, Ser. No. 574,245
Int. Cl.² F16L *41/06*
U.S. Cl. 138—99 **7 Claims**



1. A split-sleeve pipe device comprising in combination:

a cylindrical elongated housing enclosure including an upper housing-half section and a lower housing-half section connectable together around a pipe; each of said housing-half sections having first longitudinally spaced central internal semi-circular flanges disposed in planes perpendicular to the longitudinal axis of said housing-half sections, each of said housing-half sections having a second pair of internal semi-circular flanges spaced apart longitudinally on opposite sides and outwardly of said first pair of internal flanges and disposed in planes perpendicular to the longitudinal axis of said housing sections, said second flanges each having an outwardly facing conical seal surface; said housing-half sections having inwardly extending end flanges disposed in planes perpendicular to the longitudinal axis of said housing sections; said housing-half sections each having a longitudinal gasket groove along each side edge of each of said half sections for accommodating an elongated gasket portion along each side of said housing enclosure from said conical gasket seat surface at one end of said enclosure to said

conical gasket seat surface at the other end of said enclosure; each of said housing-half sections having longitudinal side flanges provided with bolt holes for coupling said housing-half sections together around a pipe; a first of said housing-half sections having boss means defining a lateral opening to said housing enclosure and a second of said housing-half sections having an enlargement defining a chamber opening into said housing enclosure aligned with said opening of said first housing-half section; each of said housing-half sections having set screws axially aligned and circumferentially spaced through said end flange at each end of each of said half sections for expanding gasket means within said housing enclosure at each end thereof around said pipe passing therethrough; a pair of compression rings adapted to fit around said pipe and having annular outwardly extending flanges perpendicular to the axis of said ring; each of said rings being split whereby said rings may be spread apart and fitted around said pipe during assembly of said device on said pipe; and a one-piece gasket adapted to fit around said pipe within said housing enclosure between said housing-half sections to provide a fluid type seal between said housing-half sections and said pipe along a longitudinal portion of said pipe and to electrically insulate said pipe from said housing sections; said gasket having split annular end members each adapted to fit within said housing-half sections between one of said second internal flanges and the adjacent end flange of said housing-half section, each of said end members having a conical seal surface engageable with said conical seat surface on said second flange of said housing-half sections to provide an annular seal around said pipe within said housing enclosure at each end of said enclosure, annular flange portions extending inwardly and outwardly from each of said seal surfaces for surrounding and insulating said pipe and contacting respectively, said first central internal flanges and said end flanges, and said gasket having longitudinal side runner portions extending along each side of said gasket between said end members for engagement with said gasket grooves along each of said side portions of each of said housing-half sections to provide a fluid type longitudinal seal along each side of said housing enclosure between the enjoining side edges of said housing-half sections between said annular end members of said gasket.

4,015,635

TUBES FOR THE PRODUCTION OF CARRIER BAGS WITH LATERAL ACCORDION FOLDS

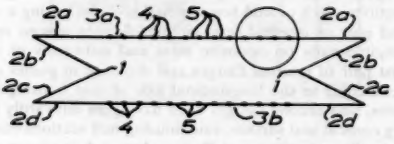
Pehr Gunnar Heine Göransson, Malmo, Sweden, assignor to Rottneros Bag System AB, Malmo, Sweden

Filed July 15, 1975, Ser. No. 596,000

Claims priority, application Switzerland, July 15, 1974, 9737/74

Int. Cl.² F16L *11/10*

U.S. Cl. 138—119 **4 Claims**



1. A tube of weldable sheeting for the production of carrier bags, comprising

a. first and second tube wall portions, extending longitudinally of the tube in circumferentially spaced relationship,

b. alternating ribs and bands extending longitudinally of the tube and forming together each of said first and second tube wall portions, each of said ribs being of lesser width and greater thickness than each of said bands,

c. third and fourth tube wall portions, extending longitudinally of the tube and integrally connected to said first and second tube wall portions so as to form a tubular formation together with said first and second tube wall portions, said third and fourth tube wall portions having a thickness corresponding approximately to ½ of the sum total of the thicknesses of one of said ribs and one of said bands.

4,015,636

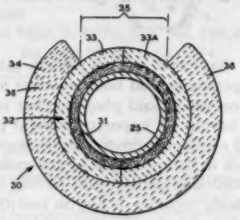
CERAMIC REFRACTORY COVERING MEMBERS

Don B. Van Fossen, Alliance, Ohio, assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Dec. 4, 1975, Ser. No. 637,569

Int. Cl.² F16L *9/10*, *9/22*; F27B *9/14*

U.S. Cl. 138—149 **6 Claims**



1. A refractory covering for application to a fluid conveying tubular member comprising a thermal insulating layer disposed about and contacting the tubular member, an inner ceramic refractory layer of split tiles disposed about and contacting the insulating layer, and an outer ceramic refractory tile layer forming a unitary collar contacting and extending about a major portion of the outer circumference of the inner tile layer to hold the split tiles together and to completely provide support of the collar by the tubular member.

4,015,637

TRIAXIAL FABRIC FORMING MACHINE AND COMPONENTS THEREOF

Murray Halton, Bryn Mawr; Norris F. Dow, Radnor; Richard M. Dow, and Michael J. Hillebrand, both of Philadelphia, all of Pa., assignors to N.F. Doweave, Inc., Philadelphia, Pa.

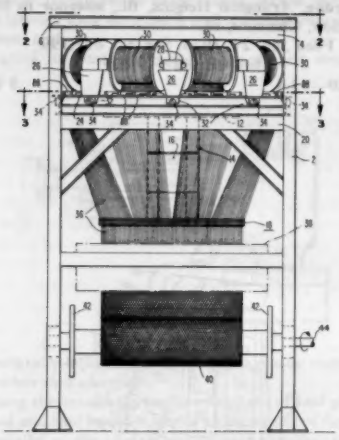
Filed Nov. 11, 1974, Ser. No. 522,751

Int. Cl.² D03D *41/00*, *49/16*

U.S. Cl. 139—11 **19 Claims**

1. In a machine for forming triaxial fabric comprising means for supplying a plurality of warp yarns in an array of two sheets of generally parallel warp yarns, and triaxial weaving means consisting of means for moving said warp yarns in each of said sheet transversely of said parallel warp yarns, the direction of movement of warp yarns in one of said sheets being opposite that of warp yarns in the other of said sheets, means transferring warp yarns from the edge of each of said sheets to the corresponding edge of the other said sheet, means for intermittently displacing selected warp yarns generally perpendicularly from the plane of said sheets to form weaving sheds, and means for taking up woven fabric on a roll, the improvement comprising a warp yarn supply creel rotatable about a vertical axis, means for guiding said warp yarns downwardly from said

creel into an array of two sheets of warp yarns adapted for weaving a triaxial fabric therefrom and means for imparting



rotational movement to said creel in timed relation with said transverse movement of said warp yarns.

4,015,638

HEDDLE FRAME ON WHICH THE LATERAL SUPPORTS ARE DETACHABLY CONNECTED TO THE FRAME STAVES

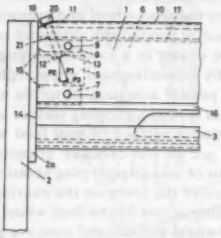
Martin Graf, Wuehrenbach, Switzerland, assignor to Grob & Co. Aktiengesellschaft, Horgen, Switzerland

Filed Mar. 16, 1976, Ser. No. 667,322

Claims priority, application Switzerland, Mar. 25, 1975, 3820/75

Int. Cl.² D03C 9/06

U.S. Cl. 139—91 **13 Claims**



1. A heddle frame comprising at least one frame stave having a recess in at least one end thereof, at least one lateral support having a projection protruding from one side thereof adjacent one end of the lateral support and adapted to be inserted in said recess so that said stave and said support are disposed at right angles to each other and connecting means for detachably securing said projection within said recess, said connecting means comprising screw means supported by said stave and extending into operative engagement with said projection in said recess to detachably secure said projection in said recess, said screw means being disposed in the plane of said frame and inclined relative to the longitudinal axis of said stave and said support and said projection being provided with a bearing surface perpendicular to the longitudinal axis of said screw means so that a component of force will be exerted on said projection parallel to said stave to draw said lateral support against the end of said stave and a component of force will be exerted on said projection parallel to said support to clamp said projection in the recess in the stave.

4,015,639

HEDDLE FRAME WITH LATERALLY DISPLACED LATERAL SUPPORTS

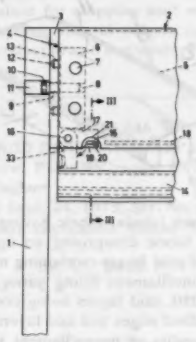
Bernhard R. Koch, Horgenberg, Switzerland, assignor to Grob & Co. Aktiengesellschaft, Horgen, Switzerland

Filed Aug. 11, 1975, Ser. No. 603,902

Claims priority, application Switzerland, Aug. 12, 1974, 10971/74

Int. Cl.² D03C 9/06

U.S. Cl. 139—92 **5 Claims**



1. A heddle frame comprising lateral supports, an elongated frame stave, mounting means securing opposite ends of said stave to said supports, a heddle carrying rod connected to and disposed below said stave in spaced parallel relation thereto in a common vertical plane, said rod being co-extensive in length with said stave, said mounting means comprising a mounting plate secured to each end of said stave at right angles thereto, and said lateral supports being secured to right opposite faces of said plates and disposed in a vertical plane laterally offset relative to the vertical plane of said stave and rod to expose the ends of said rod to enable heddles to be placed on and removed from the ends of said rod without interference by said supports.

4,015,640

HIGH SPEED BROAD FABRIC LOOM REED CONSTRUCTION

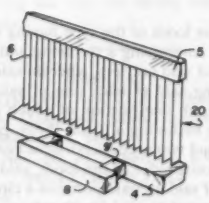
Gerhard Oesterle, Staad, SG, Switzerland, assignor to Aktiengesellschaft Adolph Saurer, Switzerland

Continuation-in-part of Ser. No. 521,759, Nov. 7, 1974, abandoned. This application Mar. 4, 1976, Ser. No. 663,918

Claims priority, application Switzerland, Nov. 28, 1973, 01672/73

Int. Cl.² D03D 49/62

U.S. Cl. 139—192 **6 Claims**

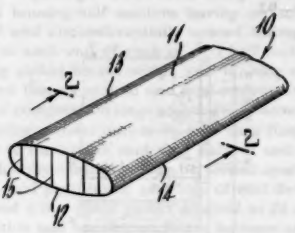


1. A reed for high speed broad fabric loom, comprising an upper reed beam, a lower reed beam, reed blades stretched between said upper reed beam and said lower reed beam, and a dynamic oscillation absorber member comprising a mass, and mounting means including, a dampening member resiliently mounting said absorber member on at least one of said upper and lower reed beams.

4,015,641
CUSHIONED NARROW WOVEN TUBULAR FABRIC

Richard Everett Goff, Jr., Barrington; Normand Daniel Guay, Woonsocket, and Joseph Amos Priestley, Barrington, all of R.I., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed July 16, 1975, Ser. No. 596,473
Int. Cl.² D03D 3/02, 11/02
U.S. Cl. 139—384 R 8 Claims

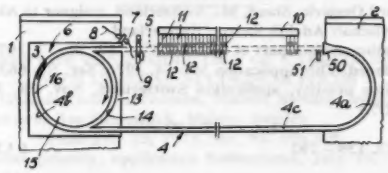


1. A narrow woven tubular fabric having a flattened oval cross-section, said fabric comprising an upper layer and a lower layer, both of said layers containing monofilament filling yarns, said monofilament filling yarns having a denier between 100 to 2080, said layers being connected together along their longitudinal edges and said layers being resiliently separated by a plurality of monofilament warp yarns alternately intermittently woven with each of said layers, said monofilament warp yarns having a denier of between 100 to 2080, the sum of the denier of a monofilament filling yarn plus a monofilament warp yarn being in the range of from 430 denier to 4200 denier and the ratio of denier of monofilament filling yarn to monofilament warp yarn being from 20:1 to 1:20.

4,015,642
SHUTTLELESS LOOM OF THE TYPE HAVING UNIDIRECTIONAL WEFT THREAD CARRIERS

Francesco Mollica, Via Cairoli, 5, Varese, Italy

Filed Feb. 23, 1976, Ser. No. 660,748
Claims priority, application Italy, Dec. 29, 1975, 30818/75
Int. Cl.² D03D 47/24
U.S. Cl. 139—438 5 Claims

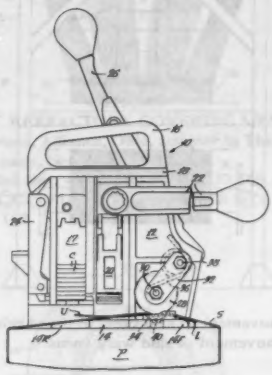


1. A shuttleless loom of the type having unidirectional weft thread carriers, comprising a throwing and recovering device for at least one of said carriers, wherein said device includes a guide for causing said at least one of said carriers to move along a closed path one portion of which passes through the shed, said guide including a linear throw portion and a linear return portion and two arcuate portions connecting said linear portions at opposite sides of the loom, said device comprising at at least one of said arcuate portions a circular guide portion substantially tangent to said linear return portion and to said linear throw portion, a flywheel rotatably arranged within said circular guide portion and defining the inner wall thereof, said flywheel being provided with entraining means for said at least one of said carriers, and means for causing said at least one of said carriers to make at least one complete revolution within said circular guide portion and to be thrown out of said circular guide portion into said throw portion after said at least one complete revolution.

4,015,643
TENSIONING TOOL WITH SELF-ENERGIZING GRIPPER PLUG

Nelson Cheung, Arlington Heights, Ill., assignor to Signode Corporation, Glenview, Ill.

Filed Jan. 21, 1976, Ser. No. 651,199
Int. Cl.² B21F 9/02
U.S. Cl. 140—93.4 8 Claims



1. A strap tensioning tool having a main frame, a base secured to the frame and adapted to contact a package to be tied with a strap loop, a strap feed wheel mounted from the main frame at a location adjacent the base, means operable to rotate the feed wheel, a gripper plug located in said base and defining a concave gripping surface, the feed wheel and gripper plug being constructed and arranged to receive overlapping ends of said strap loop, means for providing relative movement between said feed wheel and said gripper plug to permit loading and releasing of said overlapping loop strap ends, means for providing a biasing force on the overlapping strap ends between the feed wheel and gripper plug, whereby when the feed wheel is rotated the strap end contacted by the feed wheel will be drawn in a loop tightening direction, and means for pivotally mounting said gripper plug in said base location with the pivotal axis parallel to the axis of said feed wheel and with said concave gripping surface aligned symmetrically with the convex surface of said feed wheel about the mid-point of the arc of the concave gripping surface, thus permitting rotation of said gripper plug about said pivotal axis under the influence of the force on the overlapped strap ends during the tensioning action by the feed wheel, the interaction between the feed wheel surface and concave gripping surface distributing the impressed force therebetween substantially uniformly over the segment of the overlapping strap ends lying between the two surfaces to preclude pinching of the strap.

4,015,644
PRODUCTION OF A VARIEGATED PRODUCT

Alfred W. Kinney, Kansas City, Mo., assignor to Phillips Petroleum Company, Bartlesville, Okla.

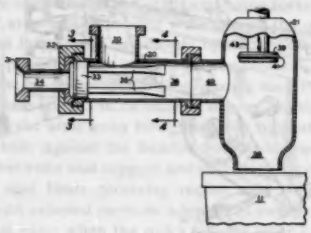
Division of Ser. No. 377,449, July 9, 1973, Pat. No. 3,886,973.
This application Mar. 31, 1975, Ser. No. 563,401
Int. Cl.² B65B 3/10
U.S. Cl. 141—9 10 Claims

1. A process for filling a container with a variegated product having a generally liquid material distributed within a generally plastic material, said process comprising:

passing a stream of said plastic material into a generally tubular chamber having a downstream outlet and an intermediate inlet, both of approximate diameter D, by forcing said plastic material under pressure into said intermediate inlet;

forming said generally liquid material into at least one ribbon-shaped stream, each said ribbon-shaped stream comprising a stream having a two dimensional cross-sectional shape, transverse to its direction of flow, defined by one relatively long dimension and one relatively short dimension; and

injecting at least one said ribbon-shaped stream of said



generally liquid material into said plastic material stream within said chamber;

passing the resultant combined stream of said plastic material and said liquid material along a path of flow generally parallel to the central axis of said chamber through said downstream outlet into a filling valve; and

periodically releasing a quantity of said combined stream from said filling valve into a container.

4,015,645

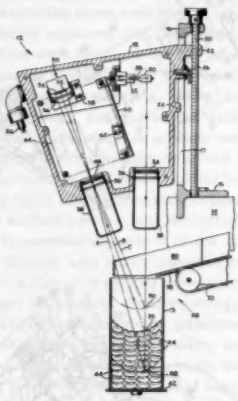
CAN FILLING APPARATUS

Donald W. Chamberlin, Los Gatos, Calif., assignor to FMC Corporation, San Jose, Calif.

Division of Ser. No. 402,431, Oct. 1, 1973, abandoned. This application Mar. 31, 1975, Ser. No. 563,540

Int. Cl.² B65B *1/14, 57/06*

U.S. Cl. 141—34 **8 Claims**



1. Apparatus for filling a container to a predetermined level comprising means for supporting a container having a vertical axis of generation, means for filling said container with a product, means for rotating the container and product about said axis, a light source, a first lens for focusing the light from said light source upon a spot on a rotating annulus that is concentric with said axis and is formed on the top surface of the product in said container, a second lens positioned so as to receive at least a portion of the light reflected from said annulus, a photodetector means having a pair of photosensitive elements positioned directly adjacent to each other in a plane parallel to the plane of said second lens, said photosensitive elements being electrically connected so that an output signal is provided therefrom which is indicative of the relative amounts of light received by each of the elements, said second lens being positioned with respect to said photodetector means and said rotating annulus so that said light reflected from said spot on said annulus is focused on said photodetector means, said photodetector means being capable of providing a continuous measurement of the angle between said lenses about said spot on said rotating annulus to thereby provide continuous measurement of the level of the top surface of the product in said container, and control means connected to said photodetector means and to said means for filling the container for stopping said means for filling the container in response to said output signal when said top surface of the product in said container reaches said predetermined level.

4,015,646

LIQUID DISPENSING APPARATUS

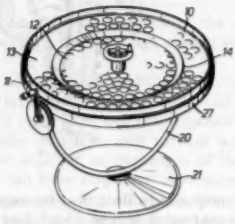
Edgar W. Borrow, Padnell Grange, Cowplain, Portsmouth, Hampshire, England

Filed Sept. 24, 1975, Ser. No. 616,493

Claims priority, application United Kingdom, Sept. 27, 1974, 42174/74

Int. Cl.² B65B *1/14*

U.S. Cl. 141—34 **5 Claims**



2. Liquid dispensing apparatus comprising

a tray, the surface of the tray having a central circular area surrounded by an annular area,

an annular upward step separating said circular area from said annular area,

an upwardly directed flange on the tray surrounding the annular area,

each said area having a plurality of apertures therein,

an equal plurality of drinking vessels removably sealed in said apertures with the rim of each vessel flush with the part of the tray defining the aperture in which it is received,

means supporting the tray for rotation about an axis through its centre perpendicular to the plane of the central area, and

means supporting the tray for tilting movement about a horizontal axis.

4,015,647

AUTOMATIC NOZZLE ASSEMBLY

Lowell F. Nelson, Muskegon, Mich., assignor to Enterprise Brass Works, Muskegan, Mich.

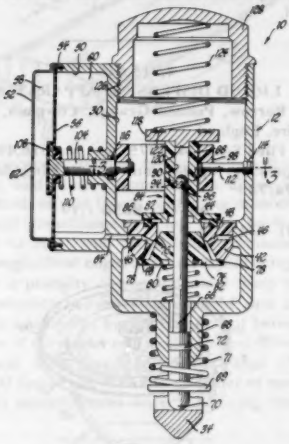
Filed Nov. 10, 1975, Ser. No. 630,302

Int. Cl.² B65B *57/14*

U.S. Cl. 141—206 **11 Claims**

1. An automatic nozzle assembly comprising: housing means having an inlet and an outlet and a fluid passage extending therebetween, an annular valve seat disposed in said fluid passage in sealing engagement with said housing and having a valve opening therethrough, said valve seat having an annular groove about the periphery thereof, at least one valve passage extending through said valve seat between said groove and said valve opening, said housing means defining a dia-

phragm cavity, a diaphragm dividing said diaphragm cavity into first and second chambers, said housing means having a passage therein communicating said second chamber of said diaphragm cavity with said annular groove in said valve seat, a valve stem extending through said housing means for engagement by a handle exteriorly of said housing means, said valve stem being in sealing engagement with said housing means and extending through said opening in said valve seat, a check valve slidably disposed on said stem for engaging said valve seat in the opening thereof on the downstream side of said opening, first spring means reacting between said housing means and said check valve for urging said check valve into said opening and for allowing said check valve to move out of



said opening in response to fluid flow to create a venturi with said opening in said valve seat to which said valve passage is responsive, a poppet valve member for engaging said valve seat in a closed position on the upstream side of said opening for closing said opening to prevent fluid flow therethrough, second spring means reacting between said housing means and said poppet valve for urging said poppet valve to said closed position, said poppet valve being disposed upon said valve stem, control means interconnecting said valve stem and said poppet valve and said diaphragm for causing said poppet valve to open in response to movement of said valve stem and to close independently of movement of said valve stem in response to movement of said diaphragm.

4,015,648

SAWMILL

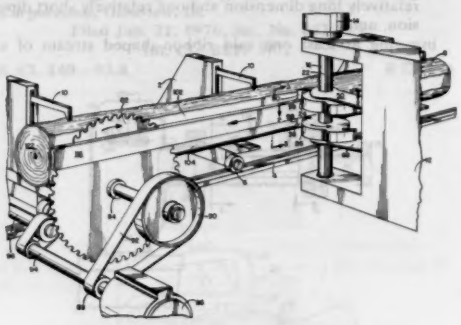
Henry M. Shepard, c/o Forest-All Corporation, Sheep Davis Road, Concord, N.H. 03301

Continuation of Ser. No. 455,965, March 29, 1974, abandoned. This application Apr. 13, 1976, Ser. No. 676,427

Int. Cl.² B27C *1/02*, *9/00*

U.S. Cl. 144—326 R **7 Claims**

1. A machine for cutting a log into boards, said machine comprising a pair of chippers mounted in axially movable and keyed relation on a vertical shaft, means for rotating said shaft and chippers at proper chipping speed, each said chipper including cutting edges defining circular paths which will produce simultaneously first vertical and horizontal surfaces on the said log, means for moving said chippers to and maintaining them at determinable vertical positions on said shaft, a reciprocable horizontal carriage, means for securing a log thereon, means for lateral adjustment of said carriage so that the said log will be engaged by the cutting edges of said chippers as the log passes thereby to produce said vertical and horizontal surfaces, a vertically positioned saw whose faces are parallel to the axis of said shaft and the direction of movement of said carriage, said saw located beyond said chippers so that an advancing log will first engage said chippers and then engage said saw, the cutting edges of said chippers being



disposed within the planes defined by the parallel faces of said saw whereby as a board is cut from said log said first vertical surfaces are replaced by saw produced vertical surfaces.

4,015,649

WOOD PLANES

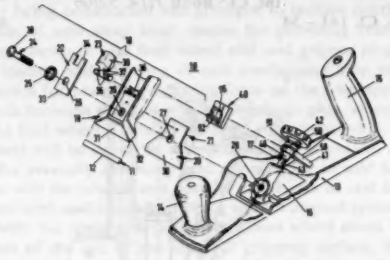
Richard Gilbert, Dronfield, England, assignor to Stanley Tools Limited, Woodside, England

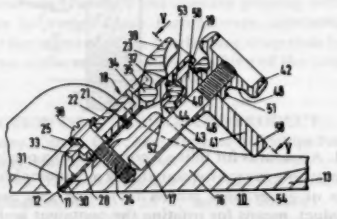
Filed Oct. 21, 1975, Ser. No. 624,313

Claims priority, application United Kingdom, Oct. 29, 1974, 46848/74

Int. Cl.² B27G *17/02*

U.S. Cl. 145—11 **3 Claims**





1. A plane adapted to be fitted with a disposable blade of the type whose maximum dimension is parallel to the direction of the cutting edge of the blade comprising a main body having a rigid central block and a planar underside; a stud rigidly fixed to and projecting from said block; a blade holding assembly mounted on said block for adjustable movement relative thereto, said assembly comprising a blade support having a blade receiving recess on one surface, a blade retaining spring member secured to said one surface of said blade support and

self-biased away from the support adjacent said recess, an elongated release plate and a quick release lever mounted on said support on the surface thereof opposite said one surface and a headed fastener retentively mounting said blade holding assembly on said block; said quick release lever including trunnions and said blade support having a groove on said opposite surface remote from said recess for receiving said trunnions, one end of said release plate being supported on said blade support and the other end being forked to provide a pair of arms resting on the trunnions of the quick release lever, said lever being selectively operable between a blade clamping position and a blade releasing position, the arrangement of the blade holding assembly being such that when the quick release lever is in its blade clamping position, the trunnions urge the arms away from the blade support causing the plate to bear against the headed bolt to clamp said spring member between said support and said block for clamping the blade in said blade receiving recess, said trunnions being formed with relieved portions adapted to engage the arms of the release plate when the quick release lever is in its blade releasing position to position the arms nearer the blade support whereby said spring member is unclamped and self-biases away from the blade support recess for releasing the blade; a rotary adjustment member threadably engaging said stud and operable for drivably advancing and retracting said blade holding assembly and an intermediate element for the blade holding assembly interposed between said assembly and the rotary adjustment member, said intermediate element engaging the rotary adjustment member so that rotation thereof in opposite directions causes advancement and retraction respectively of the element and assembly relative to the main body without rotation of the element; said intermediate element additionally permitting slewing of the blade holding assembly relative to said element.

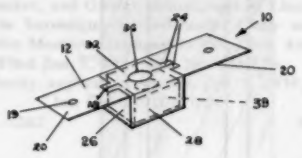
2. A plane adapted to be fitted with a disposable blade of the type whose maximum dimension is parallel to the direction of the cutting edge of the blade comprising a main body having a rigid central block and a planar underside; a stud rigidly fixed to and projecting from said block, said stud having an unthreaded portion adjacent said block and a threaded portion remote from said block; a rotary adjustment member threadably engaging said threaded stud portion and having a frustoconical surface portion; a blade holding assembly mounted on said block for movement relative thereto for adjusting the coarseness of cut of a blade mounted therein; a slewing adjustment lever pivotally mounted on said stud; an intermediate element for said blade holding assembly having a portion bearing upon the unthreaded portion of the stud and a frustoconical surface portion in confronting surface engagement with the frustoconical portion of the rotary adjustment member, said element and rotary adjustment member being interengaged by a flange-in-groove connection whereby rotation of the rotary adjustment member in opposite directions causes movement of both the rotary adjustment member and element along said stud; said blade holding assembly comprising a blade support member having a blade receiving recess, a blade retaining member secured to said support, a bolt connecting the blade holding assembly to the block and means for releasably clamping the blade retaining member between the blade support and the block for clamping the blade in the blade receiving recess; said bolt connecting the blade holding assembly to the block in such a manner that said assembly can pivot about said bolt for slewing adjustment and can move relative to the block for coarseness of cut adjustment; said element and said blade support being provided with slideable rib-in-groove connecting means extending transversely of said stud; said connecting means exhibiting an arcuate configuration along the extent thereof to facilitate said pivotal slewing adjustment; said slewing adjustment lever having a projection engaging said blade support member whereby pivotal adjustment of the lever causes pivotal slewing adjustment of said assembly relative to said element.

4,015,650

CAGED NUT

James C. Anderson, 5011 Whites Bridge Road, Smyrna, Mich. 48887

Filed Aug. 15, 1975, Ser. No. 605,198
Int. Cl.² F16B *39/00*
U.S. Cl. 151—41.76 **5 Claims**



1. A caged nut for mounting a threaded nut on a surface comprising:

a nut having a threaded opening therethrough;

housing means for enclosing the nut and limiting lateral and rotational movement thereof, said housing means comprising:

a central section abutting one side of the nut with a bolt clearance opening therethrough mating with the opening in the nut;

vertical walls extending at right angles from the central section and terminating in outer ends, said walls including two opposed ends walls and two opposed side walls that form the sides of a box, said vertical walls being positioned to be adjacent to the edges of the nut so as to prevent the nut from rotational movement;

mounting flanges extending outwardly from the outer ends of the end walls, each end wall and attached mounting flange constituting a single arm member;

locking flanges extending inwardly from the outer ends of the side walls;

locking tabs extending outwardly from the sides of the locking flanges; and

retaining means in the arm members for engaging and holding the locking tabs in place so as to prevent the side walls from spreading apart when a spreading force is exerted on the side walls by rotation of the nut, said retaining means comprising openings in the arm members that receive and retain the locking tabs.

4,015,651

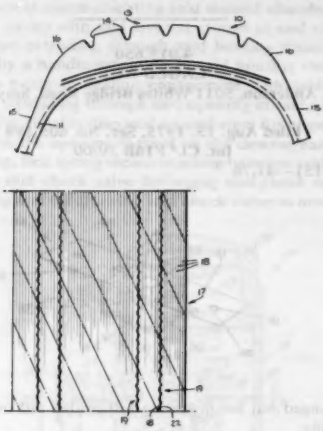
TIRE CORD CODING SYSTEM

Jerry L. Witt, Winnsboro, S.C., and Barry B. Holmes, Miami Shores, Fla., assignors to Uniroyal Inc., New York, N.Y.

Filed May 22, 1975, Ser. No. 579,769
Int. Cl.² B60C *9/16, 9/20*
U.S. Cl. 152—356 **13 Claims**

1. In a tire cord fabric adapted for use in a pneumatic tire and having means incorporated therein for identifying the source of the tire cords, said fabric comprising a multiplicity of parallel, regular cords, and at least one pair of special cords parallel to said regular cords, said special cords and regular cords each being visible and distinguishable by X-rays according to their different constructions, and each special cord in a pair of special cords being spaced from each other by a particular number of identifiable regular cords, with each particular number of spacing cords being a code representing a respec-

tive source of said regular cords whereby any given source of the regular cords in the fabric may be identified according to



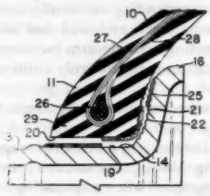
the code represented by the number of said regular cords between a pair of said special cords.

4,015,652

TIRE AND RIM ASSEMBLY

James T. Harris, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 12, 1975, Ser. No. 630,980
Int. Cl.² B60C *15/02, 17/00*
U.S. Cl. 152—379.1 **4 Claims**



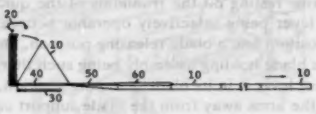
1. A tire and rim assembly comprising a rim for a wheel, said rim having a generally cylindrical shape and a pair of radially outwardly extending rim flanges at the edges, a first bead seat on said rim adjacent one of said rim flanges, a second bead seat on said rim adjacent the other of said flanges, an annular tire having a U-shaped cross section with circumferentially extending edges, a first bead portion at one of said edges and a second bead portion at the other of said edges, said first bead portion being mounted on said first bead seat and including a first annular inextensible bead ring with reinforcing plies embedded in and adhered by a bond to a bead covering material, said second bead portion including a second annular inextensible bead ring with reinforcing plies embedded in and adhered by a bond to said bead covering material, said first bead portion being adhered to said rim at said first bead seat by a cement providing a bond with sufficient strength to retain said first bead portion in said first bead seat during operation of said tire in the deflated condition and said bond between said bead covering material and said first bead ring with reinforcing plies being stronger than said bond between said first bead portion and said rim at said first bead seat so that said first bead portion can be unseated from said first bead seat without breaking said bond between said bead covering material and said first bead ring and reinforcing plies during dismounting of said tire from said rim.

4,015,653

PANEL DEPLOYMENT SYSTEM

Paul Slysh, and LeRoy E. Siden, both of San Diego, Calif., assignors to General Dynamics Corporation, San Diego, Calif.

Filed Apr. 8, 1976, Ser. No. 675,007
Int. Cl.² E06B *3/32*
U.S. Cl. 160—213 **20 Claims**



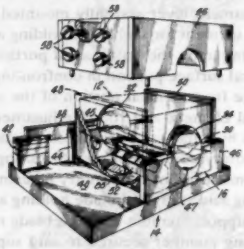
1. A deployable structure comprisng:
a plurality of panels hingedly connected together in end-to-end relation and alternately folded into an accordion folded stack;
deployment arms, each having a free end and a rotatably fixed end, said deployment arms disposed adjacent to said stack;
at least one crawler engaged with one of said deployment arms and engaged with one of said panels;
a deployment drive for rotating said deployment arms to a position substantially perpendicular to said stack;
a crawler device for translating said crawler along the longitudinal length of said deployment arm; and
a panel drive disposed on said crawler for linear movement of said panels in a deployment plane substantially coplanar with said rotated deployment arms, causing said panels to alternately unfold from said accordion folded stack.

4,015,654

ADJUSTABLE TOOLING METHOD AND APPARATUS FOR INVESTMENT PATTERNS

John B. Witchell, Pierrefonds, Canada, assignor to United Aircraft of Canada Limited, Longueuil, Canada

Filed Feb. 3, 1975, Ser. No. 546,677
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976
Int. Cl.² B22C *7/00*
U.S. Cl. 164—4 **12 Claims**



1. An apparatus for making a mold for pre-investment pattern, including a base, a locating means having indexing means adapted to be removably fitted to mating indexing means on said base, support means for supporting a representation of a form over said base, means for adjusting said representation of a form relative to said base and said locating means and means for spatially fixing said representation relative to said means.

12. A method of providing stator vane castings for a stator ring in a gas turbine engine, comprising the steps of forming a pattern of the airfoil section of the vane, providing separate inner and outer shroud mold cavities, splitting said pattern, mounting one of said split pattern sections on a support

means, providing a casting chamber with a base, placing a locating block in the bottom of said casting chamber on said base in a predetermined position relative to the said base, orienting the support member with the split pattern section thereon in said casting chamber in a position relative to said locating block, pouring casting material into said casting chamber, removing said so-formed cast having a split pattern airfoil section cavity and the locating block, matching the so-formed cast mold with a companion mold made from the other split pattern airfoil section, mounting said assembled cast pieces on a lathe by means of said locating block and machining the cast material in the areas of the ends of the mold cavity so as to provide a suitable profile for receiving the inner and outer shroud mold cavities, matching the profiled mold pieces defining the airfoil section cavity with the mold pieces defining the inner and outer shroud cavities, pouring investment materials such as wax or investment plastic, into the so-formed mold cavity, separating the mold, investing the so-formed vane pattern, testing the vane in an assembled vane ring, preparing a new investment pattern on the basis of the data from the test by using the same split pattern on the support means and orienting the split airfoil pattern section in the said casting chamber relative to the locating block in response to the data acquired from the test, repeating the steps of matching and forming the pre-investment pattern, preparing a new investment cast vane and repeating the steps of this method until a suitable throat area and stagger angle of the stator vane ring is obtained.

4,015,655

PROCESS AND APPARATUS FOR CONTINUOUSLY CASTING STRANDS OF UNKILLED OR SEMI-KILLED STEEL

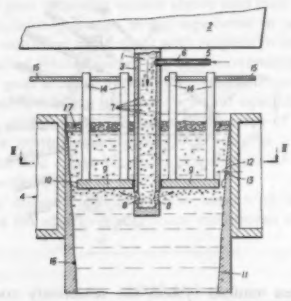
Thorwald Fastner; Max Mayrhofer, and Ernst Bachner, all of Linz, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed June 20, 1975, Ser. No. 588,817

Claims priority, application Austria, June 25, 1974, 5236/74

Int. Cl.² B22D *21/02, 11/00, 27/00, 11/10*

U.S. Cl. 164—66 **7 Claims**



1. In a process for continuously casting strands of unkilled or semi-killed steel of a certain composition with a carbon content between **0.02** and **0.20%**, wherein the steel is cast from a tundish through a casting tube extending into a water-cooled mould, a strand skin and a front of solidification forming in the mould cavity adjacent the mould walls and wherein the solidifying strand is extracted from said mould and further cooled, the improvements comprising the steps of:

adjusting the composition of said steel, prior to casting by deoxidation, to a value [%C] × [%O] of below 0.002, the steel having a content of soluble Al not exceeding 0.01% and a Si content not exceeding 0.05%;

introducing flush gas into said casting tube during casting, thereby forming gas bubbles; and

deflecting said gas bubbles emerging from said casting tube toward the mould walls by means of a horizontal guiding plate having a cross-section somewhat smaller than the cross-section of the mould cavity to cause said gas bubbles to ascend evenly distributed at said strand skin along said front of solidification.

4,015,656

STRAND GUIDING MEANS FOR GUIDING A STRAND CONTINUOUSLY CAST IN A CONTINUOUS CASTING PLANT

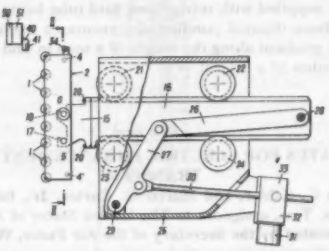
Alois Scheinecker, and Gunter Holleis, both of Linz, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Jan. 5, 1976, Ser. No. 646,670

Claims priority, application Austria, Jan. 7, 1975, 59/75

Int. Cl.² B22D *11/128*

U.S. Cl. 164—282 **11 Claims**



1. A strand guiding means for guiding one side of a strand continuously cast in a continuous casting plant having a carrying structure and a continuous casting mould, the strand guiding means comprising:

a frame part carrying support elements for said strand;

an adjustment means for adjusting said frame part relative to the strand both toward said strand and away from said strand a sufficient distance to allow said frame part to clear the mould, which adjustment means includes a displacement ruler; and

quick locking means detachably connecting said frame part with said displacement ruler to allow for a vertically upward removal of said frame part after release of said quick locking means and retraction of said displacement ruler.

4,015,657

DEVICE FOR MAKING SINGLE-CRYSTAL PRODUCTS

Dmitry Andreevich Petrov, ulitsa Chkalova, 21, kv. 80, and Alexei Tikhonovich Tumanov, ulitsa Bolshaya Gruzinskaya, 36, kv. 58, both of Moscow, U.S.S.R.

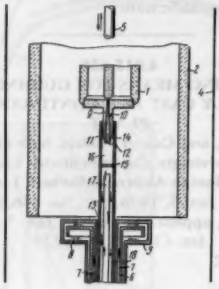
Filed Sept. 3, 1975, Ser. No. 609,976

Int. Cl.² B22D *15/04*; **B01J** *17/20*

U.S. Cl. 164—361 **7 Claims**

1. A device for making single-crystal products by vertically-directed crystallization of molten metal, comprising: a ceramic mould for the molten metal, said ceramic mould having a bottom formed with a pocket for accommodating a seed intended for the initiation of the crystal and making single-crystal products, said bottom of said mould including a wall and said pocket extending downwardly from said wall; a cooler formed with an axial hole, said cooler being situated under said mould with provision for vertical motion; a cooling unit for cooling a seed in said pocket, said cooling unit extending into said axial hole of said cooler, interacting with said seed pocket, installed with provision for independent vertical movement relative to said cooler and seed pocket, and including a tube having an upper end region surrounding and embracing said seed pocket; a partition in said tube, said partition

being situated at an elevation lower than said seed pocket and dividing the space in said tube into an upper compartment into which said seed pocket extends and a lower compartment



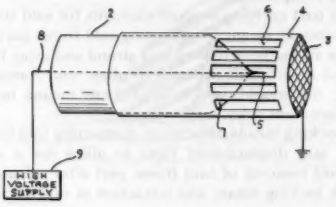
which is supplied with refrigerant; said tube being made of a metal whose thermal conductivity ensures a maximum temperature gradient along the length of a seed in said pocket for the initiation of a crystal.

4,015,658

APPARATUS FOR ELECTRIC ENHANCEMENT OF HEAT TRANSFER

Kenneth G. Kibler, and Harris G. Carter, Jr., both of Fort Worth, Tex., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 12, 1975, Ser. No. 631,355
Int. Cl.² F28F *13/16*
U.S. Cl. 165—96 **4 Claims**



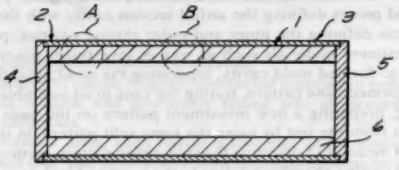
1. Apparatus for electric enhancement of heat transfer of a heated object excluding the electric field therefrom in a preselected gaseous medium comprising a solid insulating rod of a predetermine diameter conically shaped at one end thereof, an electrically conducting point rigidly affixed to said conically shaped end and extending therefrom, an external high voltage supply of a predetermined magnitude, an electrical conductor running along the longitudinal axis of said solid insulating rod interconnecting said external high voltage supply and said electrically conducting point, a grounded conductive screen, a hollow insulating tube of a predetermined diameter having first and second openings, said grounded conductive screen completely covering said first opening, said hollow insulating tube being cylindrically and longitudinally slotted in the approximate region of said first opening, permitting free motion of said preselected gaseous medium, said hollow insulating tube enclosing said solid insulating rod and slightly pressure fitted thereto permitting sliding over said solid insulating rod for adjustment of the spacing of said electrically conducting point and said grounded conductive screen, the combination of said solid insulating rod, said electrically conducting point, said high voltage supply, said hollow insulating tube, and said grounded conductive screen constituting a first probe, the grounded conductive screen of said first probe being placed in the immediate region of said heated object to permit concentration of electric current flow toward the heated object.

4,015,659

HEAT PIPE

Hermann J. Schladitz, 74 Plaentschweg, Munich, Germany

Filed June 9, 1975, Ser. No. 584,951
Claims priority, application Germany, June 10, 1974, 2427968
Int. Cl.² F28D *15/00*
U.S. Cl. 165—105 **4 Claims**



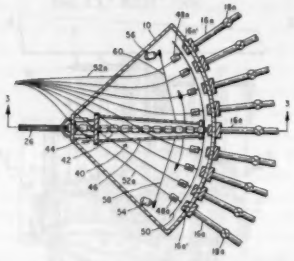
1. A heat pipe, comprising a tightly sealed pipe-shaped body having an inner capillary system, said body being partially filled with a volatile medium and having a heat absorbing end and a heat emitting end, the capillary system comprised of polycrystalline metal whiskers at least in the region of the heat absorbing end and of the heat emitting end of the heat pipe, the whiskers having a metallic connection to the wall of the heat pipe the capillary system including metallized inorganic threads or fibers, between the end sections of polycrystalline metal whiskers.

4,015,660

SUBSEA OIL AND GAS PRODUCTION MANIFOLD SYSTEM

Harry R. Lewis, Jr., Chicago, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Dec. 16, 1975, Ser. No. 641,216
Int. Cl.² E21B *43/01*
U.S. Cl. 166—.5 **5 Claims**



1. A subsea maifold system for selectively connecting a transport line to one of a plurality of well lines from underwater wells, which comprises:

an enclosed wedge-shaped container,

a plurality of well-line inlets arranged in an arc on the inside of said container,

a passage in said container at the approximate center of a circle defined by said arc, said passage connected to said transport line,

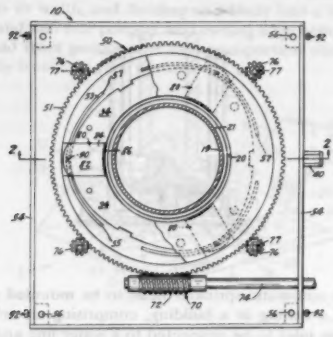
a hollow, flexible arm having a first end connected to said passage and the other end extendible to and retractable from said arc, and

means to move said other end of said flexible arm to a selected well-line inlet, including means to extend and to retract radially said other end of said flexible arm to and from said inlet.

4,015,661
APPARATUS FOR COUPLING AND UNCOUPLING PIPE SECTIONS

John L. Christensen, 906 11th St. SE., Rochester, Minn. 55901

Filed Mar. 15, 1976, Ser. No. 667,024
Int. Cl.² E21B *33/03*
U.S. Cl. 166—77.5 9 Claims



1. Apparatus for coupling and uncoupling pipe sections at the head of a well casing, said apparatus comprising:

a. a base member adapted to support a platform over the head of a well casing, said platform having an opening therein which is adapted to permit said pipe sections to pass therethrough;

b. a plurality of self-engaging clamps supported on said platform around the periphery of, and projecting slightly over, said opening, said clamps being supported in a manner such that force exerted upwardly thereagainst by a pipe coupling in said opening effects disengagement of said clamps with respect to said pipe coupling but force exerted downwardly against said clamps will effect self-engagement thereof with respect to the periphery of said pipe coupling to prevent further downward movement, and rotational movement, of said coupling;

c. means for preventing self-engagement of said clamps with respect to said pipe coupling;

d. drive gear retaining means above said base and platform, said retaining means being supported in such a manner that rotational movement with respect to said platform is restricted while upward vertical movement is permitted,

e. drive gear means supported by said retaining means, said gear means being aligned over said opening in said platform, said gear means having a plurality of gripping arms in the center thereof adapted to grip a pipe section therein and cause rotational movement of said pipe section with respect to said coupling;

f. power means operatively associated with said drive gear means for effecting rotational movement thereof.

4,015,662
WELL TOOL WHICH CHANGES RECIPROCATING MOVEMENT TO ROTARY MOTION

Chudleigh B. Cochran, Houston, Tex., assignor to Brown Oil Tools, Inc., Houston, Tex.

Filed Oct. 23, 1975, Ser. No. 625,259
Int. Cl.² E21B *43/00*; E21C *3/00*
U.S. Cl. 166—104 21 Claims

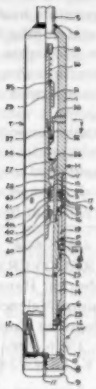
1. A well tool comprising:

a. a tubular housing connectable in fluid communication with the lower end of a pipe string;

b. a piston assembly carried by said housing for relative reciprocal movement therein between first and second terminal positions in response to fluid pressure communicated to said housing through said pipe string;

c. a working member carried by said housing for movement between first and second terminal positions in response to said reciprocal movement of said piston assembly;

d. valve means carried by said housing and having a closed position relative to said piston assembly blocking communication between said pipe string and a portion of said piston assembly, and an open position relative to said piston assembly permitting fluid communication between said pipe string and said portion of said piston assembly; and

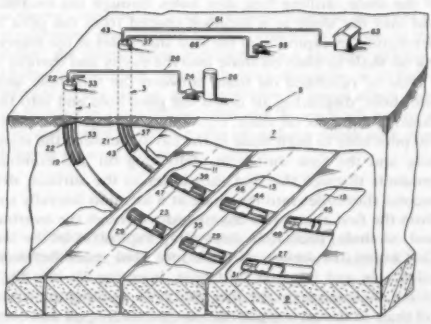


e. retainer means cooperative between said valve means and said piston assembly to retain said valve means in said closed position when said piston assembly is in said first terminal position, but releaseable responsive to predetermined movement of said piston assembly toward said second terminal position to permit movement of said valve means to said open position and fluid communication with said portion of said piston assembly or returning said piston assembly to said first terminal position.

4,015,663
METHOD OF SUBTERRANEAN STEAM GENERATION BY IN SITU COMBUSTION OF COAL

Malcolm K. Strubhar, Irving, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 11, 1976, Ser. No. 665,985
Int. Cl.² E21B *43/24*, *43/26*; F24J *3/02*; F28D *21/00*
U.S. Cl. 166—258 4 Claims



1. A method of burning in situ a subterranean coal formation and recovering the heat resulting therefrom, comprising:

a. providing a first well and a second well that extend from

the surface of the earth and communicate with said coal formation;

b. forming by hydraulic fracturing techniques a first fracture that extends through said coal formation and communicates with said first well and said second well;

c. forming by hydraulic fracturing techniques a second fracture, spaced apart from said first fracture, that extends through said coal formation and communicates with said first well and said second well;

d. injecting a combustion-supporting gas into said first fracture;

e. igniting said coal to form a combustion front about said first fracture and to generate heat and hot product gases;

f. continuing to inject said combustion-supporting gas into said first fracture to propagate said combustion front through said coal formation along said first fracture and conduct said heat through said coal formation and into said second fracture;

g. injecting a fluid into said second fracture to absorb said heat and heat said fluid; and

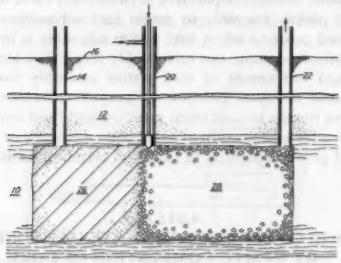
h. continuing to inject said fluid into said second fracture to flow said heated fluid through said second fracture to facilitate the recovery of said heat.

4,015,664

SHALE OIL RECOVERY PROCESS

Willard P. Acheson, Pittsburgh; Hans H. A. Huygen, Bakerstown, and Robert P. Trump, Valencia, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Apr. 14, 1976, Ser. No. 677,040
Int. Cl.² E21B *43/24*, *43/26*
U.S. Cl. 166—259 **9 Claims**



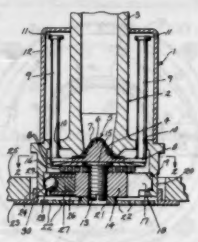
1. A method of producing oil from oil shale covered by overburden comprising drilling a pilot hole through the overburden and into the shale, undercutting the pilot hole through an interval in the shale and removing cuttings therefrom to form a cavity of enlarged diameter adapted to allow expansion of the shale, drilling first shot holes through the overburden and into the shale at a location spaced from the pilot hole, detonating an explosive in the first shot holes in the interval of the oil shale to blast oil shale into the cavity and thereby form a mass of rubblized oil shale between the shot hole and the pilot hole, displacing air down the pilot hole and into the oil shale, igniting the oil shale, continuing the injection of air into the pilot hole to burn shale in the cavity between the injection hole and the first shot hole, delivering oil and combustion products through the first shot holes to the surface, drilling second shot holes into the shale at a location laterally spaced from the first shot holes downwardly through the overburden and oil shale, thereafter detonating explosives in the second shot holes to rubblize oil shale into void space between the pilot hole and the first shot hole, injecting air into the rubblized shale adjacent the first shot hole, igniting the rubblized oil shale in the oil shale formation, producing oil and combustion products through a second shot hole, and repeating the series or rubblizing and in-situ combustion steps to cause combustion of the oil shale to move laterally through the oil shale.

4,015,665

CONCEALED SPRINKLER HEAD

John R. Simons, Delavan, and John W. Fenske, Wauwatosa, both of Wis., assignors to Grunau Company, Inc., Milwaukee, Wis.

Filed Aug. 7, 1975, Ser. No. 602,831
Int. Cl.² A62C *37/06*, *37/12*
U.S. Cl. 169—40 **3 Claims**



1. An automatic sprinkler head to be mounted above the level of a ceiling in a building, comprising an orifice body having an inlet to be connected to a water line and having a discharge outlet, a valve cap assembly to enclose the outlet and including deflector means, said deflector means acting to deflect the water being discharged from said outlet in a desired spray pattern when said valve cap assembly is moved to the open position, latch means disposed in engagment with said valve cap assembly to maintain said assembly in the closed position, one end of said latch means defining a projection, first abutment means formed on said orifice body and disposed to be engaged by said projection, said latch means having a recess located in spaced relation to said projection, said recess having a generally horizontal axis, said latch means includes a vertical opening communicating with the inner end of said recess, a tubular housing connected to said opening and projecting downwardly from said latch means, a fusible element disposed within said housing and adapted to melt at a predetermined elevated temperature, a series of balls disposed within said housing and said recess, the innermost of said series of balls being disposed in engagement with said fusible element, second abutment means formed on the orifice body and spaced from said first abutment means, the outermost of said series of balls being engaged with said second abutment means, and a decorative plate carried by said housing and adapted to bear against the undersurface of the ceiling, said housing projecting downwardly beyond said plate, melting of said fusible element resulting in said outermost ball being moved inwardly of said recess to release said latch means and open said discharge outlet.

4,015,666

SOD UNDERCUTTING KNIFE

Gerardus Johannes Brouwer, Keswick, and Theodorus Petrus Hubertus Gerrits, Newmarket, both of Canada, assignors to Brouwer Turf Equipment Limited, Keswick, Canada

Filed Mar. 3, 1975, Ser. No. 554,811
Int. Cl.² A01B *45/04*
U.S. Cl. 172—19 **6 Claims**

6. An undercutting knife for a sod cutting machine, said knife comprising:

a. an undercutting blade have a front cutting edge, and a rear portion,

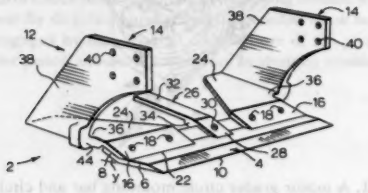
b. combined support and guide means for said undercutting blade, said support and guide means having a front portion and a rear portion, and means detachably connecting said front portion of said support and guide means to said rear portion of said blade for smooth passage of sod from said blade over said support and guide means,

c. said rear portion of said support and guide means having two outer edge portions, one at each side thereof, each

edge portion being located above said front cutting edge so that said edge portions remain above the ground when said knife is in normal use,

d. a pair of mounting arms one integrally connected to each outer edge portion, each arm being adapted to be connected to carrying means for carrying and reciprocating said knife,

e. said blade having a transverse bend therein extending across its width, and dividing said blade into a front portion and said rear portion, said cutting edge being formed on said front portion and said rear portion slanting upwardly from said rear portion,



f. said front portion of said support and guide means having a bevel in its lower surface at the front edge thereof, the angle between said bevel and the remainder of the lower surface of said front portion of said support and guide means being the same as the angle between said front and rear portions of said blade, said bevel lying over the upper surface of said front portion of said blade immediately in front of said bend, whereby to reduce interference to movement of sod passing from said blade over said support and guide means.

4,015,667

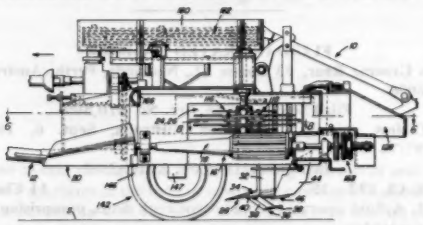
COTTON STALK AND ROOT SHREDDER WITH RE-BEDDER

Aldo Ruozi, 157 N. McDonald Way, Bakersfield, Calif. 93309

Filed Apr. 14, 1975, Ser. No. 568,127

Int. Cl.² A01B *35/18;* **A01D** *43/12*

U.S. Cl. 172—133 **16 Claims**



1. In a root and stalk shredder which includes a frame movable in a direction of movement along a path of travel, a pair of longitudinally extending, parallel, power driven lifting rollers rotatably mounted on the frame and extending longitudinally parallel to the path of travel, guide means mounted on the frame forward of the rollers in the direction of movement of the frame for guiding stalks between the roller, a blade assembly mounted on the frame over the rollers and operatively associated with the rollers for cutting roots and stalks lifted by the rollers, and a plow assembly mounted on the frame; the improvement wherein the plow assembly comprises, in combination:

a. a standard attached to the frame;

b. an earth engaging digging blade affixed to the standard and arranged vertically below and centrally between the rollers substantially rearward of the rollers along the path of travel of the frame for effecting a splitting of the earth and freeing of the roots subsequent to an initial grasping of the stalks by the rollers;

c. a fin including a fin affixed to the undersurface of the digging blade and extending cantilever fashion away from the digging blade and the standard to a free end terminating the fin, and an uplifting wing mounted on the free end of the fin and transversely to the fin, the fin assembly being arranged for fracturing the soil below the digging blade, preventing soil compaction by the digging blade, and facilitating directional plant root growth; and

d. a furrowing-out shovel blade attached to the standard adjacent to the digging blade and arranged extending substantially rearwardly of the standard along the path of travel of the frame for splitting the bed and leaving a furrow open for receiving shredded crop,

the improvement further comprising a bed re-shaping assembly arranged rearwardly of the frame relative to the direction of movement of the frame, the bed re-shaping assembly including, in combination:

1. a pair of notched disc blades;

2. bracket means mounted on the frame and rotatably mounting the disc blades for lifting and lowering the disc blades relative to the frame and selectively engaging the disc blades in a bed being re-shaped;

3. first and second tool bars adjustably connected to the bracket means, the disc blades rotatably mounted on the first and second tool bars at a point thereon spaced from the connection of the first and second tool bars to the bracket means; and

4. a tool bar assembly mounted on the bracket means together with and adjacent to the notched discs, the tool bar assembly including a third tool bar adjustably attached to the first tool bar, and a sweep blade adjustably mounted on the third tool bar at a point thereof spaced from the attachment of the third tool bar to the first tool bar, the first tool bar and third tool bar being arranged extending in substantially parallel planes.

16. In a root and stalk shredder which includes a frame movable in a direction of movement along a path of travel, a pair of longitudinally extending, parallel, power driven lifting rollers rotatably mounted on the frame and extending longitudinally parallel to the path of travel of the frame, guide means mounted on the frame forward of the rollers in a direction of movement of the frame for guiding stalks between the rollers, a blade assembly mounted on the frame over the rollers and operatively associated with the rollers for cutting roots and stalks lifted by the rollers, and a plow assembly mounted on the frame; the improvement wherein each of the lifting rollers comprises, in combination;

a. a cylindrical portion rearward of a forward end of the rollers relative to the direction of movement of the frame; and

b. a sleeve constructed from a resilient material arranged in conforming engagement on the cylindrical portion of the roller, the sleeve being provided with a plurality of longitudinally extending, outwardly projecting ribs on an outer surface of the sleeve, and a plurality of longitudinal rods embedded in each lifting roller sleeve, each rib having a rod associated therewith, for absorbing shock and prolonging wear of the sleeve.

4,015,668

POWER CULTIVATOR APPARATUS

Richard R. Wilson, 6901 W. 36th Street South, Wichita, Kans. 67215

Filed Oct. 21, 1974, Ser. No. 516,433

Int. Cl.² A01B *69/00;* **B62D** *51/04*

U.S. Cl. 172—260 **2 Claims**

1. A power cultivator apparatus operable for earthworking operations in limited space areas, comprising:

a. a power means mounted on a support and guide means;

b. said support and guide means including a main support frame assembly having a centrally positioned drive wheel assembly connected thereto and at one end a handle bar assembly secured thereto;

c. a tool means connected to said main support frame assembly having a tool member secured to a tool support frame;

d. a control means including a tool control assembly to raise and lower said tool member;

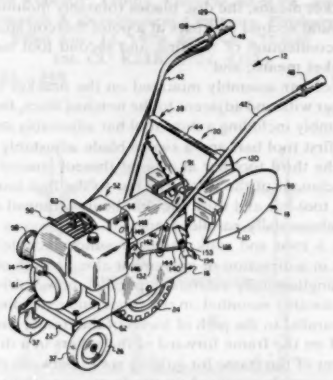
e. said tool control assembly having a foot operable tool actuator connected to said tool support frame;

f. said tool actuator including an actuator member secured to a lock bar, and a spring member connected to said tool actuator to bias same to the latched condition

g. said tool support frame having a latch member releasably connectable with said lock bar;

h. said actuator member movable through one's foot against the bias of said spring member and out of engagement with said latch member to raise or lower said tool member, and, on removing one's foot from said actuator member, said spring member moves said lock bar into locking engagement with said latch member;

i. said support and guide means having a lateral support wheel assembly mounted on a forward portion of said main support frame assembly;



j. said lateral support wheel assembly including a pair of wheel members each rotatably mounted on a separate shaft member from the shaft member on which the other of said pair of wheel members is mounted, each said shaft member connected to a separate actuator arm member from the actuator arm member connected to the other said shaft member, and each said arm member pivotally connected to said support frame assembly by a common shaft member interconnecting said actuator arm members;

k. said control means including a wheel control assembly having a foot operably wheel actuator connected to one of said actuator arm members by a rod member, said wheel actuator pivotally connected to said support frame assembly and a wheel spring member connected to said wheel actuator and to said support frame to bias said wheel actuator to raised and lowered positions;

l. said wheel actuator, when positioned in said lowered position, cooperating with said drive wheel assembly to support said power cultivator apparatus on a ground surface; and

m. said wheel actuator, when moved by one's foot to said raised position, causes rotation of said actuator arm member and raising of said wheel members out of contact with the ground surface for earthworking operations with said tool means.

4,015,669

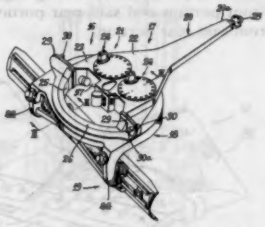
CIRCLE MOUNTING BAR AND CIRCLE ASSEMBLY FOR A MOTOR GRADER

Carroll Richard Cole, Decatur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 3, 1976, Ser. No. 663,594

Int. Cl.² E02F *3/76*

U.S. Cl. 172—796 **28 Claims**



1. A motor grader circle mounting bar and circle assembly comprising, in combination:

a circle mounting bar including a beam with a connecting end, and a circle carrying structure which is structurally integral with the end of said beam opposite said connecting end, said carrying structure comprising an annular, upright wall member provided with a drive opening, and radially outwardly extending top and bottom flange members on said wall member which define therewith an outwardly open annular cavity, said flange members having bearing surfaces facing into said cavity, and one of said flange members being detachably connected to said wall member;

and a circle structure rotatably mounted between said flange members, said circle structure comprising an annular member which has continuous bearing surfaces abutting the bearing surfaces on said flange members and cooperating with the carrying structure to define a closed annular chamber, and internal ring gear means on said annular member in the same transverse plane with the drive opening so said ring gear means may be driven by a drive member supported on the carrying structure;

and a separate sealing means between said annular member and each of said flange members to seal said chamber.

4,015,670

FLUID OPERATED HAMMER

Ian Graeme Rear, 53 Louise St., Nedlands, Perth, Australia 6000

Filed Sept. 5, 1975, Ser. No. 610,809

Claims priority, application Australia, Sept. 6, 1974, 8797/74

Int. Cl.² E21B *5/00;* **E21C** *7/00*

U.S. Cl. 173—15 **11 Claims**

1. A fluid operated hammer for rock drills, comprising:

a cylinder;

a drill chuck mounted at one end of said cylinder to receive a drill bit;

a drill sub attached to the other end of said cylinder;

a tubular fluid feed tube mounted in the drill sub and extending towards the chuck, the longitudinal central axis of the feed tube corresponding to the longitudinal central axis of the cylinder;

at least one set of apertures provided in the side wall of the feed tube and spaced from each end;

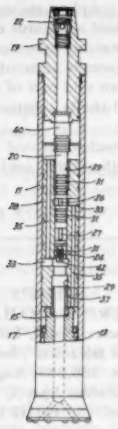
a piston slidably mounted in the cylinder and over the feed tube to move between the drill chuck and drill sub, the lower end being adapted for striking an anvil portion of the drill bit extending through the drill chuck;

a first passageway in said piston communicating with one end face thereof and opening into the centre of the piston at a location spaced along the length of said piston;

a second passageway in said piston communicating with the end face of the piston communicating with the end of the piston opposite to that of the first passageway and opening into the centre of the piston at a location spaced along said piston;

the central bore of the piston having at each end of a counterbored portion, the remaining length of the central bore being of uniform diameter corresponding substantially to that of the feed tube, wherein said piston is symmetrical about its central diametric axis to be reversible in the cylinder without affecting the function thereof;

said drill bit being capable of limited longitudinal movement in the drill chuck and said anvil portion being formed with an upwardly directed annular spigot intended to be sealingly engaged by the adjacent counterbore of the piston when the piston and anvil portion are in abutting relationship;



one of said passageways communicating with one of said set of apertures in the feed tube when the piston is in abutting relationship with the anvil portion and said drill bit portion occupies its innermost position in respect of the chuck; to admit fluid into the space between the piston and drill chuck to drive the piston upwards;

the other of said passageways communicating with one of said set of apertures, when the piston is at its upper position in the cylinder and said drill bit portion occupies its innermost position in respect of the chuck, to admit fluid into the space between the piston and drill sub to drive the piston downwards; and

wherein when said drill bit is at its outermost position in respect of the chuck, the piston is maintained at its lowermost position abutting the anvil position, the upper counterbore is in communication with one of said set of apertures and said second fluid passageway provides communication between the uppermost end of the piston and the space between the end of the feed tube and the drill bit.

4,015,671

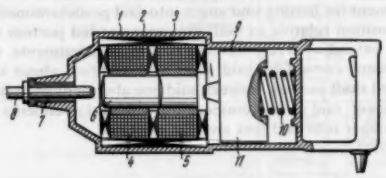
ELECTRIC HAMMER

Vladimir Mikhailovich Borisov, ulitsa Grekova 14, kv. 69; Boris Grigorievich Goldshtein, Molodogvardieskaya ulitsa 24, korpus 1, kv. 26; Albert Adlofovich Goppen, Novocheremushkinskaya ulitsa 44, korpus 2, kv. 90; Vladimir Alexeevich Eletsky, ploschad Vosstania 1, kv. 12"a".; Viktor Lvovich Sherman, Leningradskoe shosse, 7/2, kv. 606, all of Moscow; Kherbert Zhanovich Bush, Komsomolskaya ulitsa 13, kv. 23, Daugavpils; Nikolai Pavlovich Ryashentsev, Krasny prospekt, 50, kv. 53, and Evgeny Mikhailovich Timoshenko, ulitsa Sibiryakov-Gvardeitsev, 8, kv. 51, both of Novosibirsk, all of U.S.S.R.

Filed Apr. 17, 1973, Ser. No. 352,030

Int. Cl.² B25D *11/06*

U.S. Cl. 173—117 **2 Claims**



1. An electric hammer comprising: a housing; a stator accommodated in said housing; a hammer piston reciprocably mounted in said stator; a shock absorber accommodated in said housing and including a resilient member and an intermediate member disposed between said hammer piston and said resilient member; the mass of said intermediate member of the shock absorber being greater than the mass of said hammer piston, the mass of said intermediate member of the shock absorber and the force of said resilient member being determined by the ratio between the natural frequency of oscillations of the intermediate member and the stroke frequency of the hammer member, said ratio being substantially equal to (0.25–0.6).

4,015,672

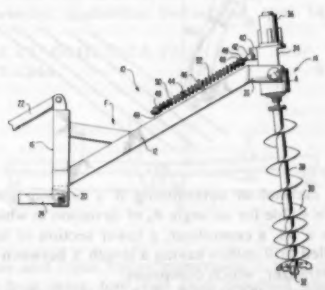
DIGGER ATTACHMENT

Daniel E. Kinnison, 119 E. 9th St., Kimball, Nebr. 69145

Filed July 7, 1975, Ser. No. 593,500

Int. Cl.² E21C *5/00*

U.S. Cl. 173—160 **6 Claims**



1. A digger attachment for a tractor comprising a frame including an elongated arm, an auger carried by said frame arm adjacent one end thereof and for pivotal movement about a transverse pivotal axis, said auger having a rotatable shaft carrying a blade, means carried by said frame adjacent the opposite end thereof for securing the frame to the tractor for movement of said arm between a raised position with said auger blade poised for initial penetration into the ground and

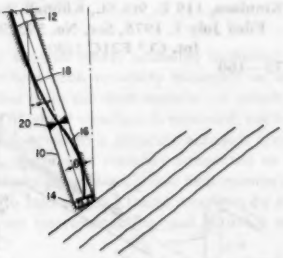
a lowered position with the auger blade penetrating the ground to a predetermined depth respectively, and means cooperable between said frame arm and said auger for biasing said auger for movement into a first angular position relative to said arm such that, when said arm lies in its raised position, the rotational axis of said auger blade is slightly inclined from a true vertical line through its transverse pivotal axis with the auger blade tip located on the side of said true vertical line remote from said securing means, said auger being pivotal about its transverse axis and against said biasing means when said arm is moved from said raised position to said lowered position such that the rotational axis of said auger blade is substantially parallel to said true vertical line when said arm lies in said lowered position, said biasing means including a shaft pivotally carried by one of said auger and said arm and an abutment carried by each of said shaft and the other of said auger and said arm, and a spring about said shaft between said abutment for biasing said auger into said predetermined angular position relative to said arm, an extended portion of said shaft extending freely through one of the abutments, a third abutment carried by said shaft and a spring about the extended shaft portion between said one abutment and said third abutment, said springs cooperating with said abutments to bias said auger into said first angular position.

4,015,673

DIRECTIONAL DRILLING SYSTEM

James T. Craig, Jr., Bixby, and Arthur Park, Tulsa, both of Okla., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 487,482, July 11, 1974, Pat. No. 3,961,674. This application Mar. 22, 1976, Ser. No. 669,367
Int. Cl.² E21B *7/04*
U.S. Cl. 175—61 **2 Claims**



1. A method of determining if a bottom hole assembly (BHA) is stable for an angle θ_o of deviation in which the BHA includes a bit, a centralizer, a lower section of heavy-walled pipe called drill collars having a length X between said bit and said centralizer, which comprises:

a. determine the angle θ_o, θ_o being the angle the centerline of the lower section of heavy-walled pipe makes with the center line of the borehole;

b. if the angle θ_o is positive, i.e., centerline of the lower section of heavy-walled pipe is above the centerline of the hole, the BHA is stable, proceed to step (e);

c. if the angle θ is negative, decrease the length X;

d. repeat step (a), if θ_o is positive, the BHA is stable; if θ_o is not positive, repeat steps (c) and (a) until θ_o is positive;

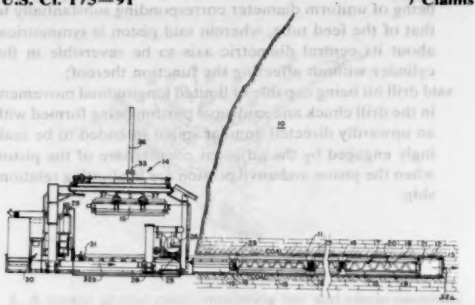
e. then using the stable BHA in the drilling of a well.

4,015,674

APPARATUS FOR UNITIZING A PAIR OF AUGERS

Arthur L. Hawthorne, St. Clairsville, Ohio, and David R. Hazen, McMurray, Pa., assignors to Consolidation Coal Company, Pittsburgh, Pa.

Filed May 2, 1975, Ser. No. 574,071
Int. Cl.² E21C *13/04*
U.S. Cl. 175—91 **7 Claims**



1. Apparatus for unitizing a pair of side-by-side augers wherein each auger includes a shaft adapted to rotate about its axis having rotational coupling means at each end and flightings along its length, said apparatus comprising:

a. bearing means rotatably mounted on each of said shafts;

b. spacing means pivotally secured to each of said bearing means and between said pair of augers to align the rotational axis of said shafts substantially parallel with each other; and

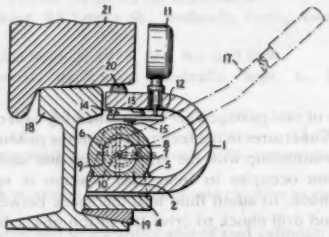
c. joining means attached to said spacer means to secure said auger pair with another said rotatably coupled auger pair.

4,015,675

METHOD OF MEASURING A RAILWAY-VEHICLE LOAD

Tzvyatko Penchev Stanev, Sofia, Bulgaria, assignor to DSO "Bulgarski Darjavni Jeleznitzi", Sofia, Bulgaria

Division of Ser. No. 388,888, Aug. 16, 1973, Pat. No. 3,887,002. This application Apr. 3, 1975, Ser. No. 564,664
Int. Cl.² G01G *3/00*
U.S. Cl. 177—1 **1 Claim**



1. A method of measuring the load of a railway vehicle wheel for a railway vehicle on a track which comprises the steps of:

a. disposing between said track and a wheel of the vehicle a U-shaped shackle having a lower arm and an upper arm;

b. lifting said lower arm while said upper arm bears against said wheel, thereby causing said arms to deflect toward one another; and

c. registering the relative deflection of said arms toward one another on a dial guage whereby the deflection of said arms registered on said gauge at the instant said wheel is lifted from said track represents the wheel load.

4,015,676

RECORDING SCALE, FOR THE RECOVERY OF USED MATERIALS SUCH AS WASTE PAPER

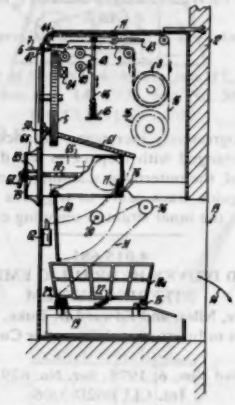
Henri Pittet, 6, rue du Mileant, 1203 Geneva, Switzerland

Filed May 27, 1975, Ser. No. 581,162

Claims priority, application Switzerland, May 25, 1974, 7175/74

Int. Cl.² G01G *23/20*

U.S. Cl. 177—5 **24 Claims**



1. A recording scale, especially for the recovery of used materials such as waste paper, said scale comprising:

a. a weighing means;

b. a closed casing enclosing said weighing means for determining the weight of materials presented;

c. means for recording weight determined by the weighing means;

d. means defining an opening in said casing and accessible from the exterior thereof for introduction of materials to be recovered, said opening being located opposite to said weighing means for bringing the materials to be weighed onto said weighing means, and

e. ejecting means for transferring the weighed materials from said weighing means into a storage chamber, said ejecting means including an actuating member accessible from the exterior of said casing for operation of the ejecting means, and means normally holding said actuating member in a locked position and releasing said actuating member to allow operation of the ejection means in response to actuation of the weighing means, the weight-recording means being operable in response to operation of said ejecting means.

4,015,677

AUTOMATIC PATIENT WEIGHING SYSTEM

John Silva; Robert A. Garrett, both of San Diego; Franklin R. Borkat, La Mesa, and Frank Young, San Diego, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 25, 1975, Ser. No. 599,295

Int. Cl.² G01G *13/14*, *3/14*

U.S. Cl. 177—165 **4 Claims**

1. A patient weighing system comprising:

a bed assembly for receiving and supporting a patient;

weight responsive means supporting said bed assembly for producing analog signals as a function of instantaneous total weight;

analog-to-digital conversion means for converting said analog signals to commensurate digital signals;

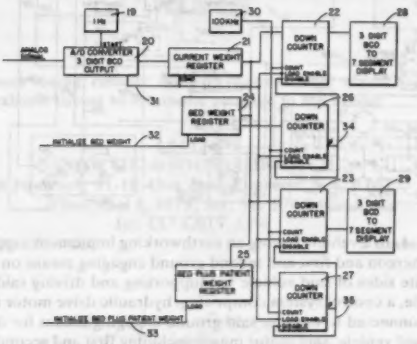
a first storage register for storing the digital signal representative of the weight of said bed assembly without the patient;

a second storage register for storing the digital signal representative of current total weight of said bed assembly with the patient;

a first down counter connected to receive the digital count from said first storage register;

a second down counter connected to receive the digital count from said second storage register;

a control clock for cyclically actuating said analog-to-digital conversion means at a predetermined frequency and producing cyclic signals for enabling said first and second down counters to load the digital counts from said first and second registers, respectively;



a second clock having a substantially higher frequency than said control clock and connected for simultaneously counting down said first and second down counters;

a connection from the output of said first down counter producing a signal when it reaches zero count for disabling said second down counter, whereby the remainder digital count in said second down counter is representative of net patient weight; and

means responsive to said remainder digital count for visually displaying patient weight.

4,015,678

MASS AND FORCE METER WITH LEVELLING MEANS

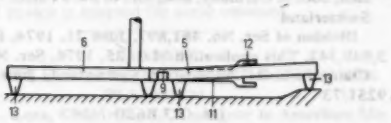
Armin Wirth, and Johannes Wirth, both of Zurich, Switzerland, assignors to Wirth, Gallo and Company, Switzerland

Filed Aug. 6, 1975, Ser. No. 602,423

Claims priority, application Switzerland, Nov. 14, 1974, 15297/74

Int. Cl.² G01G *21/28*, *21/12*; F16M *13/00*

U.S. Cl. 177—244 **8 Claims**

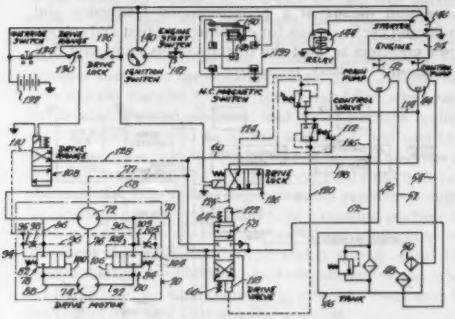


1. A mass and force meter comprising a four cornered frame with four sides, four legs each mounted under one corner of said frame, a four cornered load support with four sides resting upon said frame by means of four intermediary levers, each pair of opposite sides of the frame as well as the load support mounted for undergoing a relative angular displacement around an axis bisecting each pair of oppositely located sides under the effect of the weight of the meter itself, when the meter is positioned on an uneven surface, while two originally parallel and adjacent sides of the frame and the load support remain substantially parallel.

4,015,679
DRIVE RANGE AND LOCK CONTROL SYSTEM

Ronald J. Klitz, Mosinee, Wis., assignor to J. I. Case Company, Racine, Wis.

Filed May 16, 1975, Ser. No. 578,354
Int. Cl.² F16H *39/48*
U.S. Cl. 180—66 R **11 Claims**



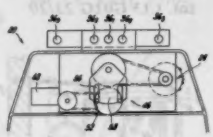
1. In a vehicle having an earthworking implement supported thereon and first and second ground engaging means on opposite sides of said vehicle for supporting and driving said vehicle, a control system comprising: hydraulic drive motor means connected to operate said ground engaging means for driving said vehicle, said motor means including first and second drive motor sections; a hydraulic fluid reservoir: main hydraulic circuit means including said drive motor means, said reservoir, main pump means for supplying fluid under pressure from said reservoir to said drive motor means, fluid actuated drive valve means actuatable to control flow of pressurized fluid to and from said drive motor means, and speed control valve means in said main hydraulic circuit having a first position supplying fluid to both said drive motor sections at a first slower speed range and a second position precluding supply of fluid to one of said motor sections to operate said motor means at a second higher speed range; control hydraulic circuit means including said reservoir, said drive valve means, control pump means for supplying fluid under pressure to actuate said drive valve means, manually operated control valve means for controlling flow of fluid under pressure to and from said drive valve means to control actuation thereof; and selectively actuatable means operable to connect one of said hydraulic circuit means to said speed control valve means to move said speed control means to said second position.

4,015,680
AUTOMATIC RAILLESS GROUND CONVEYOR INSTALLATION

Herbert Pircher, Planegg, and Johannes Hambuch, Geiselbullach, both of Germany, assignors to Buro Patent AG, Glarus, Switzerland

Division of Ser. No. 481,897, June 21, 1974, Pat. No. 3,948,342. This application Mar. 25, 1976, Ser. No. 670,456
Claims priority, application Switzerland, June 26, 1973, 9251/73
Int. Cl.² B62D *1/24*
U.S. Cl. 180—98 **5 Claims**

1. An automatic railless ground conveyor installation comprising a guide track for defining a route network having branches, a number of individual driverless traveling conveyor cars, each of said conveyor cars possessing steering mechanism for the contactless scanning of the guide track and a work control mechanism, said work control mechanism including code reading means for the contactless scanning of individual code markings identifying the branches and directly influencing the steering mechanism in the sense of reaching a destination determined by a target code set at the work control mechanism, the steering mechanism comprising a central scanning element which during straight ahead travel of the conveyor car is located over the guide track and after turning of the conveyor car onto the guide track serves to reset the steering deflection of the conveyor car, and at least two scanning elements arranged to each side of the central scanning

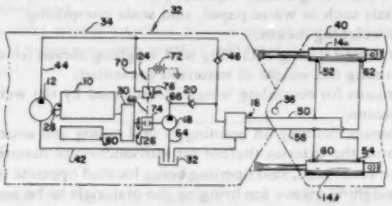


element at progressively increasing distance therefrom and transversely arranged with respect to the direction of conveyor car travel, the outermost scanning elements when activated by the guide track serve to trigger a greater steering deflection than the inner situated scanning elements.

4,015,681
GROUND DRIVEN HYDRAULIC EMERGENCY STEERING SYSTEM

Daniel B. Shore, Niles, and Edward D. Duke, Chicago, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Nov. 6, 1975, Ser. No. 629,441
Int. Cl.² B62D *5/06*
U.S. Cl. 180—133 **4 Claims**



1. An emergency steering system for use with a hydraulic steering system of a vehicle including a primary driven pump, a reservoir source of fluid, a selective valving means including a steering valve and means to position said steering valve, a hydraulic steering cylinder and first conduit for delivering fluid from said reservoir source of fluid through said driven pump and said selective valving means to said hydraulic steering cylinder, said first conduit means hosting a one-way check valve allowing fluid to flow from said pump to said selective valving means, and further second conduit for delivering fluid from said steering cylinder through said selective valving means to said reservoir source of fluid, the improvement comprising:

an emergency fluid pump having an input port and an output port for supplying fluid to said hydraulic steering system;

a ground drive source having motion corresponding to the motion of said vehicles;

a electromagnetic clutch means coupled to said emergency fluid pump and said ground drive source which when engaged allows said ground drive source to drive said emergency fluid pump and which when disengaged prevents said ground drive source from driving said emergency fluid pump;

sensing means responsive to the presence of fluid pressure in said first conduit;

third conduit means allowing fluid communication between said output port of said emergency fluid pump and said first conduit means of said hydraulic steering system;

a one-way check valve allowing fluid to flow in only one direction in said third conduit;

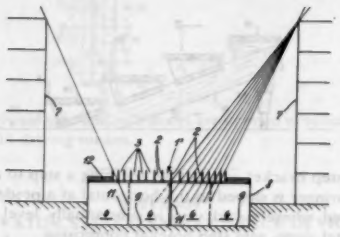
a fourth conduit means allowing fluid communication between said inlet port of said emergency fluid pump and said reservoir source of fluid.

4,015,682

PROTECTING SYSTEM FOR ROADWAY ADJACENT AREAS

Alfred Keller, Hermikonstrasse 25, CH-8600 Dubendorf, Switzerland

Continuation of Ser. No. 434,315, Jan. 17, 1974. This application Apr. 14, 1975, Ser. No. 567,773
Int. Cl.² G10K *11/00*
U.S. Cl. 181—33 E **18 Claims**



1. The combination comprising:
a. a roadway adapted for motor vehicular traffic and extending along the surface of the ground, and
b. a noise protecting assembly for controlling sound emanating from the roadway,
c. said noise protecting assembly including a frame structure and a plurality of walls consisting at least partially of sound absorbent material,
d. said frame structure having dimensions of length and width and including a portion disposed above the roadway,
e. said walls having a width disposed vertically above the roadway,
f. said walls having a length disposed in a direction parallel to the centerline of the roadway and being laterally spaced with respect to each other across the width of the frame structure thereby forming intervals therebetween,
g. said walls and intervals being effective to prevent the direct path of sound from a source of noise on the roadway to objects in the vicinity of the roadway,
h. said intervals being between the walls and allowing the passage of air and light to the roadway.

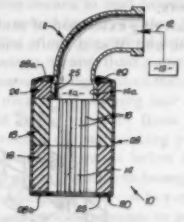
4,015,683

NOISE SUPPRESSOR FOR VACUUM SWEEPER AND THE LIKE

William H. Williams, Rancho Palos Verdes, Calif., assignor to Purex Corporation Ltd., Lakewood, Calif.

Filed Dec. 29, 1975, Ser. No. 644,932
Int. Cl.² F01N *3/06*; A47L *5/00*
U.S. Cl. 181—36 R **10 Claims**

1. In a noise suppressor package attachable to air exhaust tubing, the combination comrising:
a. annular body means defining an axially extending bore to pass said exhaust, said body means including compressible foam segments which project radially inwardly at said bore, said segments being axially elongated and circularly spaced, and
b. a tubular cover extending about said body means and having a flexible neck at one end of said body means, said



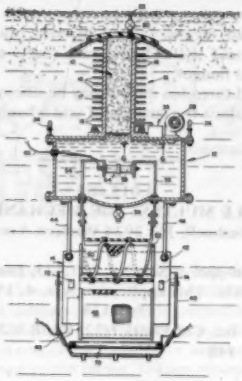
neck being radially inwardly constrictable about said exhaust tubing to retain the package to the tubing.

4,015,684

SNOW FIELD SOUND IMPLODER

Joseph Pauletich, 91-18 43rd Ave., Elmhurst, N.Y. 11373

Filed May 5, 1975, Ser. No. 574,240
Int. Cl.² G01V *1/04*
U.S. Cl. 181—120 **5 Claims**



1. A sonic imploder comprising a top steam chamber, a tank in communication with said chamber, a pump for maintaining the water level in said tank, a transformer, an electrode in said tank electrically heated by said transformer and a heater ring at the bottom of said imploder for melting snow and ice in which said device is adapted for sonic emission.

4,015,685

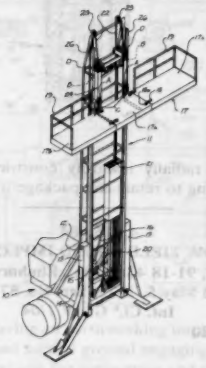
APPARATUS FOR ALIGNING A MOBILE LIFT WORK PLATFORM

Leonard L. Lenz, Greenville, S.C., assignor to American Mobile Corporation, Greenville, S.C.

Filed June 16, 1975, Ser. No. 586,944
Int. Cl.² B66B *9/20*
U.S. Cl. 182—145 **2 Claims**

1. In a work platform carried for movement up and down on parallel rails longitudinally mounted on an upright tower wherein the work platform is cantilevered laterally on a carriage on each side thereof movable on said rails, the improvement including:
A. a pair of vertically spaced wheels carried by said carriage on each outer side of said rails laterally thereof;
B a pair of transversely spaced flanges carried by said carriage adjacent each of a pair of said wheels;

C. a member bridging each pair of said flanges;
D. a shaft extending at right angles through each of said pairs of flanges adjacent and in alignment with said bridging members;
E. a wheel carrying extension of said shaft carried eccentrically of one end of said shaft; and



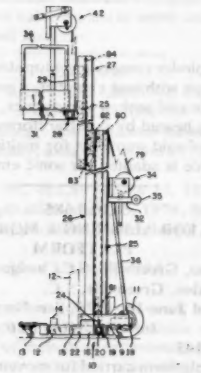
F. a threaded means carried by said bridging members engaging said shafts fixing said shafts against rotation within said flanges;
whereby said threaded means may be disengaged from said shafts to adjust the spacing of said wheels from the adjacent rail.

4,015,686

PORTABLE MULTI-STAGE MECHANICAL LIST

Sherman W. Bushnell, Jr., 2924 Western Ave., Seattle, Wash. 98121

Continuation-in-part of Ser. No. 327,623, Jan. 29, 1973, Pat. No. 3,876,039. This application Apr. 4, 1975, Ser. No. 565,138
Int. Cl.² E04G *1/22*; B66B *9/20*
U.S. Cl. 182—148 **13 Claims**



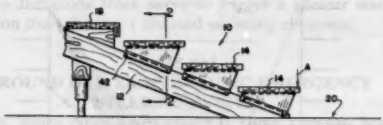
1. In combination:
a first mast having a stop,
a sheave assembly slidably mounted on the first mast for downward movement relative to said stop,
a latch carried by the first mast for movement between inactive and latching positions,
means for moving the latch from inactive position when said sheave assembly engages said stop into latching position when said sheave assembly moves downwardly away from said stop, and
a second mast slidingly carrying said first mast and having a row of vertically spaced recesses arranged to receive said latch when the latch is in latching position whereby the first mast is locked against downward movement relative to said second mast when said latch occupies one of said recesses.

4,015,687

STEP BRACKET

Robert Dean, Owosso, Mich., assignor to Spiral-Craft, Owosso, Mich.

Filed Jan. 8, 1976, Ser. No. 647,625
Int. Cl.² E06C *7/08*
U.S. Cl. 182—220 **6 Claims**



1. A step bracket adapted for securing a step to a stringer which stringer is sloped to the horizontal at a predetermined angle and wherein said step is substantially level with the horizontal slope, said step bracket comprising
a first elongated flat portion positioned on top of and abutting said stringer, said first portion having at least two apertures formed therethrough;
a second flat and triangularly shaped portion disposed in a vertical plane and having its lower edge secured to one lateral edge of said first portion and having its upper edge generally horizontal,
a third flat portion disposed in a horizontal plane and having one end secured to the upper edge of said second portion, said third portions having at least two spaced apertures formed therethrough;
a fourth flat portion disposed in a vertical plane and having its upper edge secured to the other lateral edge of said first portion, wherein said fourth portion flatly abuts against the side of said stringer and includes at least two spaced apertures formed therethrough, and
means for fastening said step to said bracket and said bracket to said stringer.

4,015,688

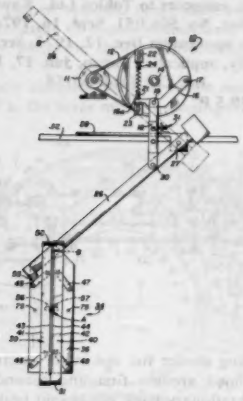
MASTER DOOR OPERATOR FOR VERTICALLY MOVABLE ELEVATOR GATES AND LANDING DOORS

Karl Mangel, 4709 B Church St., Skokie, Ill. 60076

Filed June 23, 1975, Ser. No. 589,030
Int. Cl.² B66B *13/12*
U.S. Cl. 187—52 LC **12 Claims**

12. In an elevator including an elevator car having a vertically movable gate and a plurality of vertically movable landing doors at a plurality of landings, comprising
driving clutch means pivotally mounted to said gate for limited rotation in a vertical plane,
said clutch means including first and second clutch plates,
a plurality of driven clutch means pivotally mounted to respective ones of said doors,
said driven clutch means including a pair of clutch members,
means carrying said clutch members in spaced apart relationship for movement of said clutch plates therebetween,
driving means carried by said elevator car including a pivotally mounted arm for lifting and rotating said plates, and
means operative upon rotation of said driving means for

causing said clutch plates to move apart into engagement with said clutch members,



whereby said gate and said doors are opened in synchronism by said driving means.

4,015,689

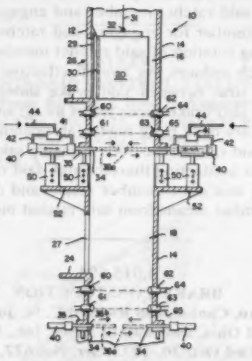
ELEVATOR SYSTEM SAFETY BRACE DEVICE

Ronald Johnson, Chicago, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed Mar. 13, 1975, Ser. No. 558,057

Int. Cl.² B66B *5/06*

U.S. Cl. 187—62 **5 Claims**



1. An elevator safety device for use with elevators installed in an elevator shaft in a building or other structure including an elevator car and supporting means for said car for movement in said elevator shaft for movement between floors of said building, comprising: a plurality of safety brace elevator movement blocking means engaging said elevator shaft and extensible into and out of the path for movement of said elevator car for blocking downward movement of said car in said shaft; said safety brace elevator movement blocking means including at least one elongated brace member; support bracket means carried in said elevator shaft for supporting said brace member for movement of said brace member from retracted to extended positions on said support bracket means and including brace member reciprocating means for moving said brace member from extended to retracted positions and back again; brace retaining means for retaining said brace means member in extended normal position to block descent of said elevator car; retracting control means for operating said brace reciprocating means for moving said brace means members into retracted position out of the path of descent of said elevator car whenever said car undergoes less than a predetermined excessive rate of descent in speed; fluid cylinder housing means; piston means in said housing means and connected at one end to a said brace member for movement therewith; valve means for admitting a fluid into said housing means for moving said piston means; fluid pumping means for actuating said piston means; timing control means for actuating said fluid pumping means for moving said piston means and said interconnected brace member from extended car blocking position to retracted car unblocking position whenever said speed of car descent remains below said predetermined rate of speed; and actuating means brought into action upon excessive speed of descent of said car beyond a predetermined speed to actuate said blocking means to prevent retraction thereof and block movement of said car therepast in said shaft.

4,015,690

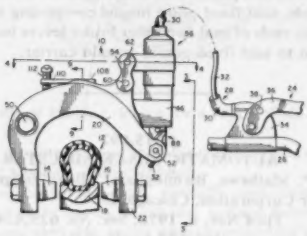
BICYCLE BRAKE WITH FORCE MODIFYING MEANS

Allen E. Armstrong, 34 Robinson Road, Lexington, Mass. 02173

Continuation-in-part of Ser. No. 602,668, Aug. 7, 1975. This application Oct. 24, 1975, Ser. No. 625,534

Int. Cl.² B62L *1/16*

U.S. Cl. 188—24 **17 Claims**



1. In combination with a force applying device, a brake assembly for an element rotatably mounted on a frame, comprising a pair of calipers, brake pads carried by the calipers and engageable with the rotatable element, means pivotally mounting at least one of the calipers for angular displacement about an axis fixed to the frame, linkage means connected to said calipers for displacement thereof respectively at different leverage ratios, guide means connected to the linkage means for guiding movement of said one of the calipers, and force transmitting means connecting the force applying device to the linkage means and to the other of the calipers for sequentially displacing the calipers relative to the rotatable element at said different leverage ratios, said linkage means including a lever element pivotally mounted on the frame about said fixed axis, a link connecting said one of the calipers to the force transmitting means, and means pivotally connecting said other of the calipers to said lever element about a movable axis establishing a higher of said leverage ratios for said other of the calipers.

4,015,691

DISC BRAKE FOR RAILWAY VEHICLES

Hans Pöllinger; Franz Prahl, and Mathias Schörwerth, all of Munich, Germany, assignors to Knorr-Bremse GmbH, Munich, Germany

Filed Oct. 16, 1975, Ser. No. 622,958

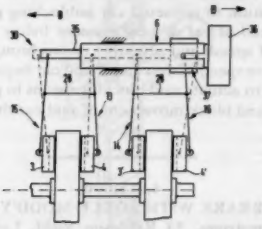
Claims priority, application Germany, Oct. 19, 1974, 2449853

Int. Cl.² F16D *55/228*

U.S. Cl. 188—59 **12 Claims**

1. A disc brake for a railway vehicle having two brake discs on the axle of a wheel and axle assembly, comprising a pair of

brake shoes on opposite faces of each brake disc, means suspending said brake shoes from the frame of the wheel and axle assembly, a pair of brake levers for each brake disc, said brake levers each having one end thereof connected to a said brake shoe and the other ends of said brake levers being remote from said brake shoes, pull-rod means for pivotally connecting each pair of brake levers between the ends thereof, said brake levers defining two outer levers and two



inner levers disposed between said outer levers, a displaceably supported brake cylinder having a reciprocable piston rod extending therefrom and said cylinder pivotally connected to the remote end of one of said outer brake levers, the remote end of the other of the outer brake levers being pivotally connected to said piston rod, and means for defining a pair of fixed points, said fixed point means comprising a carrier and the remote ends of said two inner brake levers being pivotally connected to said fixed points on said carrier.

4,015,692

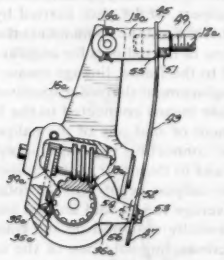
AUTOMATIC SLACK ADJUSTER

George P. Mathews, Birmingham, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Nov. 6, 1975, Ser. No. 629,424

Int. Cl.² F16D *65/56*

U.S. Cl. 188—79.5 K **16 Claims**



1. In a slack adjusting mechanism usable in lever actuating systems including a rotatable lever actuated by an actuating chamber and piston rod and connected to and rockable about the axis of rotation of a cam shaft for actuation of the system, said piston rod being secured to a clevis pivotally mounted on said lever, a worm gear in the lever secured to the cam shaft and meshing with a worm mounted on a rotatable shaft, and an adjusting mechanism including a reference point operatively connected to the worm and actuatable when the lever rocks through an arc to a point beyond the movement required for normal clearance, said reference point being provided on the end of a control arm, the opposite end of the control arm being formed as a ring journalled in said lever around the axis of rotation of the cam shaft, and means to control the location of said reference point with respect to said system during the lever rocking motion while allowing motion of said reference point with respect to said piston rod.

4,015,693

LINING WEAR ADJUSTER

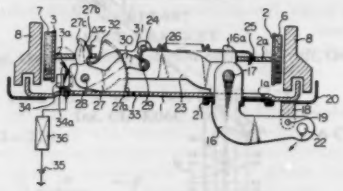
Yoshihiro Hayashida, Chigasaki, and Haruyuki Amano, Ebina, both of Japan, assignors to Tokico Ltd., Kawasaki, Japan

Division of Ser. No. 506,051, Sept. 16, 1974, Pat. No. 3,943,486. This application Dec. 12, 1975, Ser. No. 640,263

Claims priority, application Japan, Jan. 17, 1974, 49-8035

Int. Cl.² F16D *65/58*

U.S. Cl. 188—79.5 P **1 Claim**



1. An adjusting device for use in an internal-shoe drum brake having lined arcuate first and second brake shoes mounted on a stationary back plate, said brake shoes being separable from each other during the braking operation, said device comprising:

a two-part strut extending between said two brake shoes, the length of said two-part strut automatically increasing to compensate for wearing of said shoe linings, said two-part strut comprised of:

a strut member operatively connected to said first brake shoe, and

a ratchet member pivotally mounted on said strut member having a projecting end portion thereof engageable with said second brake shoe when the brake lining is worn;

pawl member means biasly mounted on said strut member adjacent said ratchet member and engageable with said ratchet member for engaging said ratchet member and preventing rotation of said ratchet member in the direction which reduces the overall effective length of said two-part strut between said brake shoes as said brake lining on said brake shoes wears away; and

said stationary back plate having an opening therethrough behind said ratchet member engaging said pawl member means for contacting therethrough said ratchet member engaging said pawl member means and disengaging the pawl member means from said ratchet member.

4,015,694

BRAKE CONSTRUCTION

John D. Danko, Canton, and Richard C. St. John, North Canton, both of Ohio, assignors to Aspro, Inc., Canton, Ohio

Filed Oct. 30, 1975, Ser. No. 627,250

Int. Cl.² F16D *51/22*

U.S. Cl. 188—106 A **17 Claims**

1. Brake construction including

a. a backing plate adapted to be mounted on a stationary part of a vehicle axle;

b. a pair of brake shoes slidably mounted in end-to-end relationship on the backing plate and expandable towards and against a brake drum, said brake shoes having camming surfaces on a pair of opposed ends;

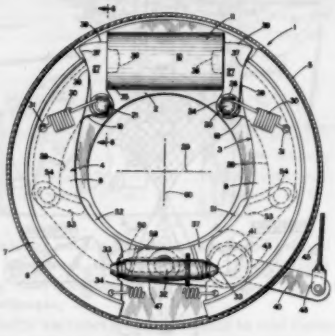
c. a hydraulic brake actuator mounted on the backing plate and located between said pair of opposed ends of the brake shoes, said actuator having an axis and a pair of pistons outwardly movable along said axis;

d. strut means interconnecting the other pair of opposed brake shoe ends;

e. a pair of lever means pivotally mounted on the backing plate, each of said lever means having a thrust transmitting portion and a swinging end portion integral with the thrust transmitting portion, said thrust transmitting portion being interposed between and respectively engage-

able with a respective one of the actuator pistons and a respective one of said pair of opposed ends of the brake shoes with the swinging end portions extending toward said other pair of opposed brake shoe ends and adapted to move inwardly in opposite directions with respect to each other when the thrust transmitting portions pivot outwardly;

f. mechanically actuated parking brake means operatively connected to the lever means swinging end portions; and



g. the lever means thrust portions each having a camming surface engageable with a respective one of the brake shoe camming surfaces, whereby, operation of the hydraulic actuator moves the pistons outwardly rotating the thrust transmitting portions outwardly in opposite directions with respect to each other and into sliding camming engagement with their respective brake shoe ends to expand said brake shoes outwardly toward a brake drum.

4,015,695

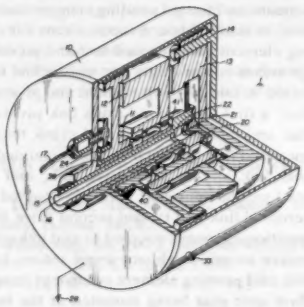
ANTI-SKID CONTROL SYSTEM

Kenneth Elvin Pope, Box 39-A Rte. 3, Wagoner, Okla. 74467

Filed Mar. 29, 1976, Ser. No. 671,089

Int. Cl.² B60T *8/093*

U.S. Cl. 188—181 A **7 Claims**



1. In an anti-skid control system for controlling the disproportionate rate between the angular deceleration of a vehicle wheel and the lineal deceleration of a moving vehicle over a surface, the combination comprising a rigid outer housing, the said housing enclosing a hollow support shaft suitable for mounting a first rotatable wheel, the said first wheel by means of an unidirectional clutch driving a controlled inertia damped second wheel, the said controlled inertia damped second wheel having in its interface a slot to accomodate at least one cam follower supported within the second wheel in a manner so as to be free to move axially to actuate a coaxial switch mounted on the end of the said hollow shaft, the said coaxial switch having means to actuate an air control valve.

4,015,696

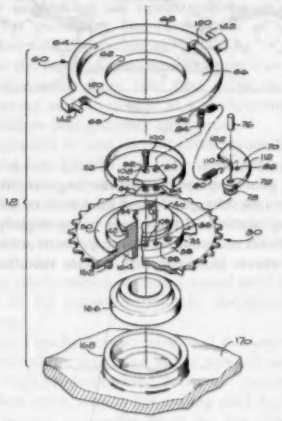
CENTRIFUGAL BRAKING DEVICE

Robert D. Lichti, 3318 Warwood, Lakewood, Calif. 90712

Filed Oct. 20, 1975, Ser. No. 624,007

Int. Cl.² B60T *7/12*

U.S. Cl. 188—189 **7 Claims**



1. A centrifugal braking device for a rotary shaft comprising:

a sprocket mounted to said shaft for rotation therewith, said sprocket having a cylindrical hub,

at least one centrifugal body pivotally connected to said hub, said body having a contact surface thereon, said body being shiftable about an axis extending generally parallel to the rotation axis of said shaft from a rest position on non-use where said contact surface is immediately adjacent to the peripheral surface of said hub to a stop position outwardly displaced from the periphery of said hub in response to centrifugal force, and

a substantially stationary annular member having an inner bore and an outer bore, said annular member being disposed concentrically around said hub with said inner bore positioned adjacent to said hub and said outer bore being radially displaced from said hub, the periphery of said outer bore being aligned with said body and having at least one contact surface defined thereon facing in countering relation to one direction of rotation of said shaft in position to be struck by said contact surface on said body for stopping engagement therewith when said body is pivoted outwardly to said stop position in response to centrifugal force, the periphery of said outer bore also defining a cam surface that aids displacement of said body from the stop position to the rest position when said shaft is rotated in the other direction.

4,015,697

RAILWAY CAR BRAKE RIGGING LINKAGE

Roland E. Cale, Cortland, Ohio, assignor to Schaefer Equipment Company, Warren, Ohio

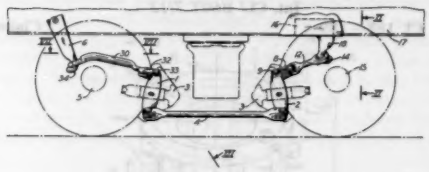
Filed Oct. 14, 1975, Ser. No. 622,373

Int. Cl.² F16D *65/14*

U.S. Cl. 188—209 **4 Claims**

1. Brake rigging linkage for connection to an upper end of a railway car brake beam lever, comprising an elongated link provided at one end with an opening for receiving a member supported by a railway car body, the opposite end of the link being provided with a rectangular slot therethrough with its

longer dimension extending lengthwise of the link, and a clevis extending through said slot and having parallel free ends provided with aligned openings therethrough for connecting it to the upper end of a brake beam lever, the portion of the clevis in said slot substantially filling it so that the clevis is restrained by the link from swinging relative to the link in a



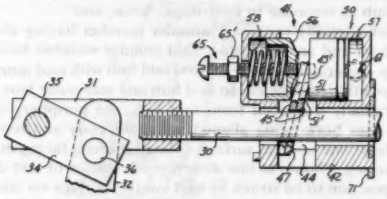
plane perpendicular to the axis of said clevis openings, the clevis being provided beside said rectangular slot with detents adjacent the link, the combined thickness of the detents and the adjoining portion of the clevis being slightly greater than the depth of said rectangular slot to prevent accidental separation of the clevis from the link before installation in brake rigging.

4,015,698

ACTUATING MECHANISM FOR PRESSURIZED FLUID BRAKE SYSTEM AND FAIL-SAFE LOCKING DEVICE THEREFOR

William Sousamian, Hacienda Heights, and John J. Filisky, Jr., Los Angeles, both of Calif., assignors to William Sousamian, Hacienda Heights, Calif.

Filed June 16, 1975, Ser. No. 587,187
Int. Cl.² F16D 65/32
U.S. Cl. 188—265 **22 Claims**



1. In a fluid pressure operated brake system where a brake actuator rod is selectively movable along a straight line path of travel corresponding to its longitudinal axis to actuate a brake crank arm disposed adjacent a first end of said actuator rod, the improvement of mechanism for connecting said first rod end to said crank arm comprising:

a clevis having an open and closed end, said clevis forming a longitudinal extension of the first end of said actuator rod with said open clevis end positioned outwardly, said crank arm being positioned to interfit within said clevis; and

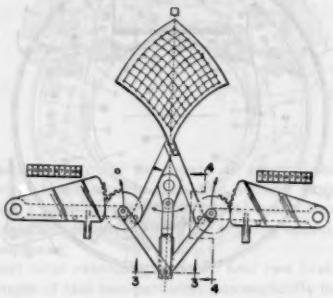
a rigid connecting member for connecting said clevis to said crank arm, one end of said conecting member being connected to said crank arm to pivot about a first axis, the other end of said connecting member being connected to the outer open end of said clevis to pivot about a second axis whereby said connecting member is disposed to extend from said crank arm outwardly from the closed end of said clevis towards its open end.

4,015,699

ALPHANUMERIC SERIAL PRINTER WITH A FLEXIBLE MEMBRANE PRINTING ELEMENT

Nicholas Kondur, Jr., Riverton, Wyo., assignor to Burroughs Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 459,020, April 8, 1974, abandoned. This application Oct. 16, 1975, Ser. No. 622,900
Int. Cl.² B41J 1/16
U.S. Cl. 197—57 **32 Claims**



1. In a printing device including a supporting frame structure having keyboard input means, a rotatable drive shaft, an actuatable hammer, and means for carrying and transversely moving a web medium relative to said hammer, the improvement comprising:

a. rotatable crank means associated with said drive shaft and rotatable therewith in response to said keyboard input means,

b. a multi-position printing element operably associated with said hammer and with the web medium carried by said carrying and moving means and having type characters arranged in columns and rows therein, said columns corresponding to a first axis of said printing element and said rows corresponding to a second axis thereof,

c. quadrilateral linkage means operably coupled to said crank means and to said printing element and effective in response to said keyboard input means for moving said printing element along its said first and second axes, said linkage means comprising a first and second terminal link connected to said printing element and pivotally coupled together, a first and second drive link pivotally coupled together and coupled also to said crank means, a rotatably mounted first spur gear pivotally coupled to said first terminal link and to said drive link, and a rotatably mounted second spur gear pivotally coupled to said second terminal link and to said second drive link,

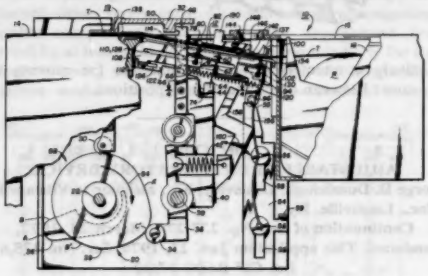
d. first positioning means coupled to said linkage means and responsive to said keyboard input means to selectively position said printing element relative to its said first axis, said first spur gear being mounted at the innermost extremity of said first positioning means, and

e. second positioning means coupled to said linkage means and responsive to said keyboard input means to selectively position said printing element relative to its said second axis, said second spur gear being mounted at the innermost extremity of said second positioning means, said selective positioning of said printing element relative to said first and second axes occurring concurrently during each rotation of said crank means, whereby individual type characters of said printing element may be selectively positioned relative to said actuatable hammer for serially printing characters on said web medium.

4,015,700
TAPE ADVANCE MECHANISM

Michael W. Paque, Stillwater, Minn., assignor to Kroy Industries Inc., Stillwater, Minn.

Filed Oct. 30, 1975, Ser. No. 627,079
Int. Cl.² B41J *1/28, 19/58*
U.S. Cl. 197—84 R 21 Claims



1. A mechanism for moving a tape to be printed through a printing apparatus, said mechanism comprising a frame for mounting said mechanism to the printing apparatus and a shuttle, wherein;

said shuttle includes a slide mounted to said frame for reciprocal movement in an operative direction and a return direction and further includes a lever arm pivotally mounted to said slide for rotation relative thereto;

said lever arm includes first force accepting means for accepting a force from the printing apparatus in the operative direction of said slide and first force exerting means for exerting a force against said first force accepting means, application of which force tends to rotate said lever arm in a first direction, and second force accepting means for accepting a force in the return direction of said slide and second force exerting means for exerting a force against said second force accepting means, application of which force tends to rotate said lever arm in a second direction and to urge said lever arm and said slide in the return direction of said slide;

said first force accepting means is movable in the operative direction of said slide independently of said first force exerting means;

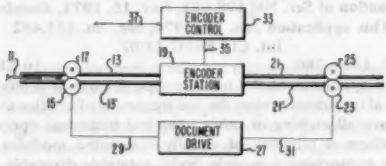
said slide includes a backing means and said lever arm includes a nipper cooperating with said backing means to limit rotation of said lever arm in the first direction and to grip the tape therebetween; and

said slide and said lever arm include stop means for limiting rotation of said lever arm in the second direction.

4,015,701
APPARATUS FOR DRIVING A DOCUMENT THROUGH AN ENCODER STATION

William B. Templeton, Howell, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Aug. 28, 1975, Ser. No. 608,567
Int. Cl.² B41J *13/00*
U.S. Cl. 197—127 R 16 Claims



1. A system for driving a document through an encoder apparatus having means for generating signals indicative of the characters to be encoded at predetermined character positions on said document and having an encoder station therein for printing said characters at said predetermined character positions, said document drive system comprising:

first drive means for transporting said document at a first relatively high predetermined document transport speed into and out of said encoder apparatus;

second drive means within said encoder apparatus for receiving said document from said first drive means and driving said document past said encoder station and toward said first drive means which again receives and exits said document from said encoder apparatus; and

means for controlling the operation of said second drive means for increasing the throughput of said encoder apparatus, said control means including:

means at the input of said encoder apparatus for receiving said document from said first drive means and for registering said document at a predetermined position as it enters said encoder apparatus;

means coupled to said second drive means for transporting said document from said predetermined position at the entrance of said encoder apparatus toward said encoder station and for driving at least that portion of said document having said predetermined character positions in which characters are to be encoded past said encoder station at a relatively constant, relatively slow predetermined encoding speed until the last character to be encoded on said document is printed thereon;

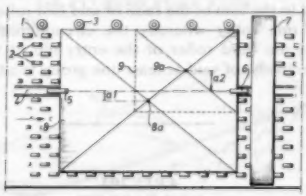
means for rapidly accelerating said document from said predetermined encoding speed toward said first relatively high predetermined document transport speed of said first drive means for exiting said document from said encoder apparatus when the last character to be encoded on said document has been printed thereon; and

means responsive to the exit of said document from said encoder apparatus for restoring said second drive means to await the arrival of the next successive document at the input of said encoder apparatus for transporting said next successive document toward said encoder station.

4,015,702
METHOD AND APPARATUS FOR CONVEYING METAL PLATES

Charles Gunnar Birger Bergling, Kungalv, Sweden, assignor to Esab-Hebe AB, Hallsberg, Sweden

Filed July 2, 1975, Ser. No. 592,674
Claims priority, application Sweden, July 8, 1974, 7408980
Int. Cl.² B65G *25/04*
U.S. Cl. 198—486 3 Claims

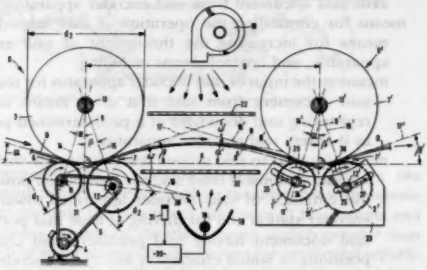


1. A conveyor for transporting large plates of a predetermined range of different sizes comprising a substantially horizontal conveyor track including means for supporting a plate free for longitudinal movement thereon, guide means extending longitudinally along a side of said track for guidingly engaging an edge of a plate to be transported, conveyor drive means including means for gripping each of the front and rear ends of a plate to be transported at points in a line parallel to said guide means, the means for gripping the plate being spaced from said guide means by from 40 to 48 percent of the width of said conveyor track.

4,015,703
SHEET MATERIAL TRANSPORT SYSTEM

Edwin Keller, Dietlikon, Switzerland, assignor to Gretag Aktiengesellschaft, Regensdorf, Switzerland

Filed Sept. 19, 1975, Ser. No. 615,108
Claims priority, application Switzerland, Sept. 24, 1974, 12923/74
Int. Cl.² B65G 15/00
U.S. Cl. 198—624 **4 Claims**



1. A transport system for moving items of material in sheet, foil, film or similar flexible form comprising:

first and second groups of rollers, each group having three rollers a first and a second of which are spaced apart to cooperate with the third roller at locations spaced around the circumference of the third roller and respectively define therewith an entry nip and an exit nip for moving such flexible items through the group of rollers, the nip planes of the entry and exit nips being inclined at an angle to one another;

at least one roller of each group being arranged to receive drive for rotating the rollers of the group to move such items through the group;

said second group of rollers being spaced from the first group with the entry nip of the second group being disposed adjacent the exit nip of the first group, the nip planes of the entry nip of the second group and the exit nip of the first group being inclined at an angle to one another to define a zig-zag path of movement for such items from the entry nip of the first group of rollers to the exit nip of the second group of rollers;

and further comprising an adjustable support means for at least one of said first and second rollers of at least one of said groups, said adjustable support means including a support device to which said at least one roller of said at least one group is journalled, said support device including means adjustable in an arc having a radius essentially equal to the sum of the radii of said first roller and said at least one roller whereby the circumferential location about the third roller of the entry nip or the exit nip, respectively, of said at least one group is adjustable.

4,015,704
EGG CARRIER

William H. Warren, 729 S. Main St., Centerville, Mass. 02632

Filed Aug. 7, 1975, Ser. No. 602,549
Int. Cl.² B65G 17/46
U.S. Cl. 198—652 **9 Claims**

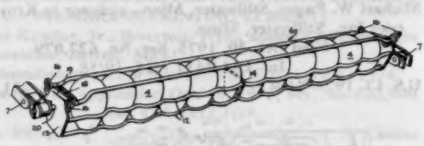
1. An improved carrier for eggs comprising the combination of:

spaced end members;

an elongated egg support including a plurality of rods extending between said end members;

means for pivotally mounting said carrier on spaced endless conveyor members; and

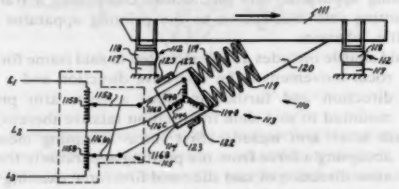
a cover pivotally mounted on said carrier including operatively connected activating members for moving the cover between open and closed positions.



4,015,705
ADJUSTABLE DRIVE VIBRATORY DEVICE

George D. Dumbaugh, Louisville, Ky., assignor to Vibranetics, Inc., Louisville, Ky.

Continuation of Ser. No. 237,276, March 23, 1972, abandoned. This application Jan. 23, 1974, Ser. No. 435,633
Int. Cl.² B65G 27/32
U.S. Cl. 198—770 **10 Claims**



5. An electric motor drive for a vibratory free mass system comprising:

a. a mass mounted for free vibratory movement,

b. drive means, including a three-phase A.C. squirrel cage electric motor carrying an eccentric weight, for exciting said mass to vibratory movement with a given frequency and stroke, and

c. control means having minimal impedance that remains essentially constant for selectively simultaneously adjusting the voltage applied across two of the three phases of said motor during its "running speed" condition of operation through a range of voltage values including a plurality of different partial values of the full voltage available while a substantially constant voltage is maintained on its third phase and thereby selectively simultaneously altering said stroke and frequency such that said motor develops negative braking torque as voltage is reduced by adjustment of said control means and, conversely, said braking torque will be released as voltage is increased by adjustment of said control means.

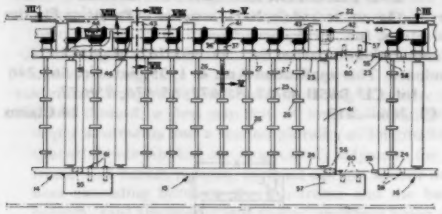
4,015,706
CONNECTING MODULES FOR AN ETCHING SYSTEM

Daniel L. Goffredo, Riverton, N.J., and Conrad Dale Shakley, Spring Mills, Pa., assignors to Chemcut Corporation, State College, Pa.

Continuation of Ser. No. 198,622, Nov. 15, 1971, abandoned. This application Jan. 15, 1974, Ser. No. 433,482
Int. Cl.² B65G 13/02
U.S. Cl. 198—780 **10 Claims**

1. An apparatus of the module type for use in a modular chemical treatment system for the treatment of articles as part of an overall etching or other chemical treatment operation that utilizes a plurality of serially connected modules, the module comprising a module body, rotatably driveable conveying means for conveying articles through the module body and for defining a longitudinal path of movement of articles through the module body, drive means for said conveying

means in driving engagement therewith, said drive means being disposed longitudinally of one side of said module and including drive rod means of substantially the length of said module in the longitudinal direction, and drive rod coupling means at at least one end of said drive rod means for operative coupling with the drive means of another module upon serially adjacent positioning of said module relative to another module for imparting rotation from one drive rod means to an adjacent drive rod means, alignment means comprising a matable component of a male-female engagement device carried by at least said one end of said module body for transversely aligning said module rigidly with the longitudinally adjacent module, and including rigid mechanical fastening



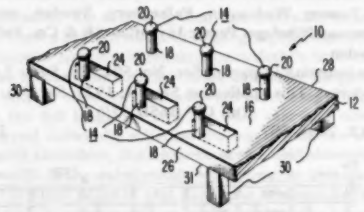
means carried by at least one end of said module body for rigid connection to an adjacent module body to be disposed thereagainst, wherein said conveying means include transversely disposed rotatable shaft members with driven gear means carried at one end thereof, along said one side of said module and with said drive means including drive gear means carried on said drive rod means in driving engagement with said driven gear means, wherein said drive gear means comprise a plurality of individual gears having gear spacer means disposed therebetween and disposed end-to-end over said drive rod means with adjacent said gears being longitudinally spaced from each other by said gear spacer means an amount corresponding to the longitudinal spacing of adjacent said driven gear means.

4,015,707

CARRIER FOR SEMICONDUCTOR COMPONENTS

Thaddeus William Kisor, Flemington, N.J., assignor to RCA Corporation, New York, N.Y.

Filed June 7, 1976, Ser. No. 694,045
Int. Cl.² B65D *73/02*
U.S. Cl. 206—328 **7 Claims**



1. A carrier for semiconductor components having header containing at least one hole therein, said carrier comprising:

an elongated strip having a plurality of protrusions extending from one side thereof, each of said protrusions having a stem portion and a knob portion, said protrusions provide means for securing said components to said strip via said hole in said header; and

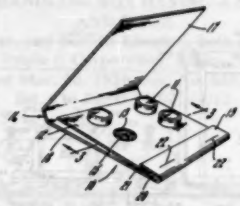
means in said strip for aligning said hole of said semiconductor components with said knob portion.

4,015,708

BUTTON CELL STORAGE AND MERCHANDISING PACKAGE

Roger William Kelm, New Richmond, Wis., assignor to Gould Inc., Rolling Meadows, Israel

Filed Nov. 21, 1975, Ser. No. 634,070
Int. Cl.² B65D *73/02, 85/58*
U.S. Cl. 206—333 **9 Claims**



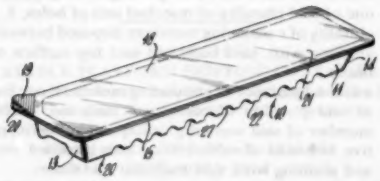
1. A storage and merchandising package for button cells which have at least one vent hole in one end thereof comprising in combination a substantially flat first layer of material having one or more apertures therein dimensioned to receive respective ones of said button cells, and a second layer of backing material laminated to the first layer and having exposed adhesive thereon in the areas underlying said apertures releasably retaining said button cells in said apertures with said one end in contact with said adhesive and said vent hole covered thereby, said first layer being relatively rigid to thereby stiffen said second layer and substantially preclude warpage thereof which tends to separate said exposed adhesive from said button cells and said second layer of material and said adhesive thereon covering said vent hole permitting the passage of hydrogen therethrough but being substantially impermeable to the passage of oxygen, carbon dioxide and water vapor.

4,015,709

SYRINGE PACKAGE

Marcus Jacob Millet, New York, N.Y., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Oct. 28, 1975, Ser. No. 626,436
Int. Cl.² B65D *85/62, 81/04*
U.S. Cl. 206—366 **11 Claims**

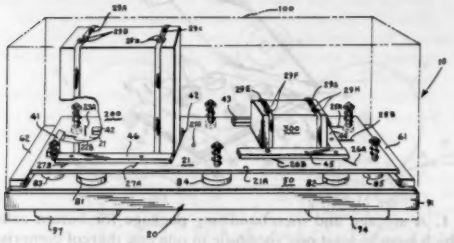


1. A container for a plurality of syringes, comprising: an elongated tray having an open top, enclosed side walls and an enclosed bottom wall, said bottom wall having an internal surface and an external surface; and means on the external surface of said bottom wall for holding said plurality of syringes after said syringes have been removed from said container and said container has been placed in an inverted position with said top facing downwardly.

4,015,710
REUSABLE SHIPPING CONTAINER ASSEMBLY

Lester G. Biggs, Newalla, Okla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 17, 1975, Ser. No. 623,528
Int. Cl.² B65D 19/26
U.S. Cl. 206—386 3 Claims



1. A reusable container assembly for housing and shipping an item, comprising:

a. means for securing and supporting the item, wherein said means includes:

1. a planar base component, of preselected configuration, made of wood and having a plurality of slots therein and therethrough, and also having a plurality of holes therein and therethrough;

2. a plurality of adjustable and removable straps made of nylon and having fasteners, with each said strap passing through two different slots of said plurality of base slots;

3. a plurality of bracing blocks, with each said bracing block removably attached to said base at two different slots of said plurality of base slots;

4. a planar floor component, of preselected configuration similar to, and of larger dimensions, than, said base, with said floor having a forward portion, an aft portion, a top surface, a bottom surface, and a plurality of holes therein and therethrough, and with said floor disposed under said base, with said plurality of floor holes in vertical alignment with said purality of base holes, thereby forming a plurality of matched sets of vertically aligned, spacedapart holes, consisting of one base hole and one floor hole;

5. first header member attached to the top surface of said floor at the forward portion thereof;

6. a second header member attached to the top surface of said floor at the aft portion thereof;

7. a plurality of bolts, one bolt for each of said plurality of matched sets of holes formed by said base and said floor, with each said bolt passing through a different one of said plurality of matched sets of holes; 8. a first plurality of cushioning members disposed between, and abutting with, said base and said top surface of said floor;

9. a second plurality of cushioning members, one for each of said plurality of bolts, with each said cushioning member of said second plurality encircling its respective bolt and simultaneously also disposed between, and abutting with, said base and said floor;

10. a plurality of relief springs, one relief spring for each of said plurality of bolts, with each said relief spring disposed on and encircling its respective bolt, and with each said relief spring having two ends, with one end abutting said base and with the other end restrained, whereby each said relief spring is held captive;

11. a plurality of skids, with each skid of said plurality having a top surface and a bottom surface, and with each said skid attached by its top surface to said bottom surface of said floor;

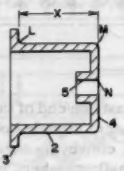
12. and, a plurality of rubbing strips, with each rubbing strip of said plurality having a top surface, and with at least two of said rubbing strips of said plurality attached by their respective top surfaces to said bottom surface of a different one of each said skid of said plurality of skids;

b. and, means for housing said means for securing and supporting the item, and for housing the secured and supported item, wherein said housing means includes a completely closeable container made of fiberboard.

4,015,711
END PLUG FOR ROLLED MATERIALS

Henry L. Mason, Scarsdale, N.Y., assignor to Precision Plastics Industries, Inc., Bridgeport, Conn.

Continuation-in-part of Ser. No. 465,762, May 1, 1974, abandoned. This application Apr. 4, 1975, Ser. No. 565,246
Int. Cl.² B65D 85/67, 85/672, 85/676, 85/677
U.S. Cl. 206—/413 14 Claims

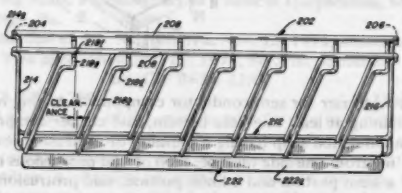


1. An improved end plug for a rolled goods packaging container which comprises a circular cylinder known as a sleeve having an external surface upon which the rolled goods are placed and an internal surface, which is concentric to and around a symmetrical axis with a continuous back flange, said back flange being nearly perpendicular to the sleeve; the outer diameter of said back flange is greater than the sleeve, and a second flange attached continously to the sleeve at the front of said sleeve, said second flange being concentric to and symmetrical with said sleeve and at least 20% of the area of said second flange being perpendicular to said sleeve, said sleeve being at an angle of 90° to the back flange for a distance of up to one-half of the sleeve length and then tapers at an angle of up to 10% off the vertical and the internal surface tapers at an angle of up to 10° off the vertical with respect to the back flange in the direction of the symmetrical axis.

4,015,712
BASKET ADAPTED TO BE STACKED IN OR ON TOP OF ANOTHER SUBSTANTIALLY IDENTICAL BASKET

Carl Tommy Wadensten, Falkenberg, Sweden, assignor to Kommanditbolaget Pemac Invention AB & Co., Falkenberg, Sweden

Continuation-in-part of Ser. No. 502,626, Sept. 3, 1974, abandoned. This application Sept. 4, 1975, Ser. No. 610,371
Int. Cl.² B65D 85/62
U.S. Cl. 206—507 22 Claims



14. In a basket construction wherein an identical pair of baskets of generally rectangular periphery are adapted to be selectively stacked or nested, respectively either one above

another or one within the other, by merely rotating one basket in its plane about a vertical axis, the baskets being nestable when corresponding walls of the baskets are in vertical alignment with each other and the baskets stacking when different walls of the baskets are in vertical alignment with each other, the improvement comprising, in combination:

each basket having a top frame of rectangular periphery providing generally straight peripheral frame legs, and a basket bottom of generally rectangular periphery, with frame legs of the top frame being joined to the basket bottom by side walls means that include at least one pair of opposite side walls that are a mirror image of each other;

each of said mirror image side walls being disposed in a vertical plane whose thickness is bounded between a vertical projection of the inner periphery of the associate frame leg of the top frame and a vertical projection of the corresponding edge of the basket bottom;

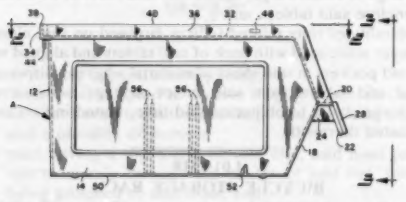
said mirror image side walls each including in said vertical plane thereof, a first plurality of longitudinally spaced upper abutments and a second plurality of longitudinally spaced lower abutments respectively adjacent the top frame and basket bottom, inclined upright spacer members extending between the top frame and the basket bottom, said abutments and spacer members being constructed and arranged so that the lower abutments on an upper basket engage upper abutments on a lower basket when the baskets are stacked, and with the lower abutments on the upper basket being longitudinally offset relative to the upper abutments on a lower basket when the baskets are nested.

4,015,713

STACKABLE STORAGE BIN

Stuart A. Clipson, Glendale, and Jack L. Lemkin, Cincinnati, both of Ohio, assignors to Midland-Ross Corporation, Cleveland, Ohio

Filed May 23, 1975, Ser. No. 580,217
Int. Cl.² B65D *21/02*
U.S. Cl. 206—509 **2 Claims**



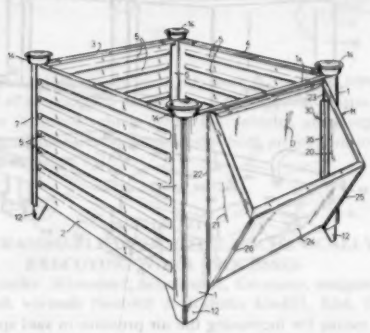
1. A stackable bin including rear and sidewalls extending upwardly from a bottom wall and sloping slightly outwardly so that the interior size of said bin decreases slightly from the top toward the bottom thereof, outwardly extending flanges adjacent the bottom edges of said sidewalls extending along substantially the full length of said bin, said rear and sidewalls being stepped outwardly adjacent the top of said bin to provide support shoulders, the distance across said shoulders on said sidewalls being substantially the same as the distance between the outer edges of said flanges so that said flanges on an upper bin are supportable on said shoulders of a lower bin, projections extending inwardly from said sidewalls above said shoulders generally parallel thereto and in forwardly spaced relationship to said rear wall, generally vertical ribs extending outwardly from said sidewalls and upwardly from said flanges, said ribs on an upper bin stacked upon a lower bin being located closely adjacent said projections on the lower bin and between said rear wall and said projections on the lower bin to block forward sliding movement of the upper bin relative to the lower bin, and said flanges on the upper bin being received beneath said projections on the lower bin to block vertical separation of the bins, whereby the same said projections which cooperate with said ribs also cooperate with said flanges to perform the dual function of blocking vertical separation and forward sliding movement of an upper bin relative to a lower bin.

4,015,714

MATERIAL HANDLING BOX HAVING A SIDE HOPPER AND DOOR

Robert L. Silver, and Bert R. Eisenhut, both of Racine, Wis., assignors to Triple E Corporation, Racine, Wis.

Filed Mar. 10, 1976, Ser. No. 665,509
Int. Cl.² B65D *21/02*, *43/12*
U.S. Cl. 206—511 **10 Claims**



1. A metal material handling box or the like formed from four vertical sides which are fabricated from sheet steel and welded together to form a one-piece unitary box, a bottom wall located between and within said sides and rigidly secured thereto, one of said sides having an outwardly extending hopper having a width extending partially across said one of said sides, said hopper having a downwardly and outwardly inclined open top, said one of said sides also having an opening coextensive with the width of said hopper whereby access to the interior of said box may be had through said inclined open top of said hopper, said hopper including two outwardly extending and generally vertically positioned sides which are formed integrally with said one of said sides of said box by being bent at approximate right angles to said one of said sides of said box, said hopper also including a bottom wall which is inclined upwardly and outwardly from said one of said sides of said box, generally vertical guide means in said one of said sides and along each edge of said opening, and a generally vertical shiftable door slideable in said vertical guide means whereby said opening in one of said sides can be completely closed or can be open to the extent to which the door is vertically raised.

4,015,715

STABLE PLATFORM SHIPPING CONTAINER

Michael A. Kelf, Bremerton, Wash., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 23, 1974, Ser. No. 436,004
Int. Cl.² B65D *81/02*; F16F *15/00*
U.S. Cl. 206—521 **2 Claims**

1. A shipping container comprising:

a. a base having a bottom member and four side wall members and four corner sections beveled at about 30° to the bottom member;

b. a platform;

c. spring bias means for operably connecting said platform to said base;

d. said spring bias means comprises four pneumatic springs;

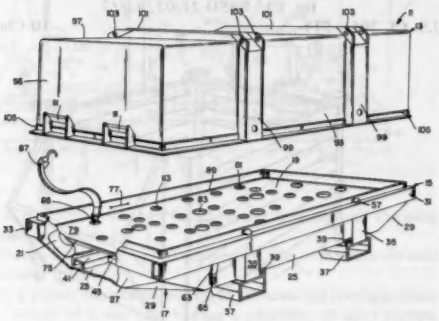
e. said platform having four corners wherein one pneumatic

spring is mounted between each corner and said base to support said platform in compression;

f. each of said pneumatic springs on one of said beveled corners being mounted with the axis of said spring being about perpendicular to said corner;

g. said platform has a preselected weight of about 800 pounds wherein said platform and said pneumatic springs are tuned to isolate said platform from shock and vibration when supporting a cargo having a weight range of from about 0 to about 800 pounds;

h. an air accumulator being operably connected to each of said pneumatic springs;



i. means for increasing the air pressure in said springs and accumulator with increased cargo weight and for decresing the air pressure in said springs and accumulator with decreased cargo weight;

j. first and second spaced apart bottom support members being operably connected to the exterior of said bottom member; and

k. first and second spaced apart longitudinal members being operably connected to the interior of said bottom member and are about perpendicular to said first and second spaced apart bottom support members.

4,015,716

CONTAINERS AND A CUSHION SUPPORT FOR USE THEREIN

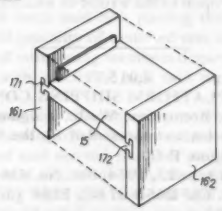
Cyril Nichols, Maidstone, England, assignor to Leonard Gould & Company Limited, Maidstone, England

Filed Mar. 10, 1975, Ser. No. 556,872

Claims priority, application United Kingdom, Mar. 11, 1974, 10847/74

Int. Cl.² B65D *81/04, 85/38*

U.S. Cl. 206—521 **13 Claims**



1. A cushion support structure for use in packaging, comprising:

a first resilient slab member having a linear dovetail mortise groove formed in a first surface thereof;

a second resilient slab member having a linear dovetail mortise groove formed in a first surface thereof;

a support member shaped in a flat polygonal form having formed on each of at least two edges a dovetail tenon complementary with the dovetail mortise grooves of said first and second slab members and being slidable therein; and,

said first and second resilient slab members depending from said support member positioning said support member in spaced apart relation from the bottom edges of said first and second resilient slab members.

4,015,717

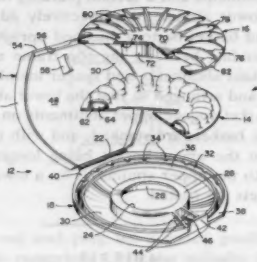
TABLET PACKAGE FOR USE IN CHRONOLOGICALLY DISPENSING TABLETS

James E. Richardson, Weston, and Stephen C. Swain, Westport, both of Conn., assignors to The Medical Dispenser Company, Atlantic Highlands, N.J.

Continuation-in-part of Ser. No. 455,979, March 29, 1974, Pat. No. 3,904,075. This application Aug. 25, 1975, Ser. No. 607,581

Int. Cl.² B65D *85/56*

U.S. Cl. 206—534 **12 Claims**



1. A tablet package for use in chronologically dispensing tablets comprising

a sheet of material having a plurality of pockets formed therein;

a plurality of tablets each disposed in one of said pockets in said sheet of material;

a frangible closure layer secured to said sheet of material to enclose said tablets; and

a plurality of time related indicia disposed on said closure layer associated with each of said tablets and aligned with said pockets in said sheet of material whereby dispensing of said tablets from said tablet package ruptures said closure layer to obliterate said time related indicia associated therewith.

4,015,718

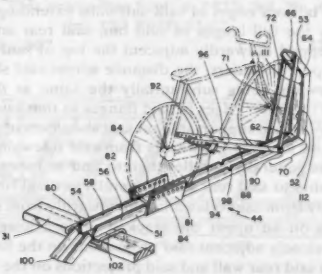
BICYCLE STORAGE RACK

Walter Bernard, 4800 S. Lake Park Ave., Chicago, Ill. 60615

Continuation of Ser. No. 567,559, Apr. 14, 1975, abandoned. This application June 4, 1976, Ser. No. 692,964

Int. Cl.² B62H *3/08, 5/00*

U.S. Cl. 211—5 **9 Claims**



1. A bicycle storage rack comprising at least one bicycle receiving channel member including a first, elongate, generally horizontally disposed, segment, a second generally

upright segment extending upwardly from one end of said first segment, and a rigidly mounted third segment extending angularly upwardly from the upper end of said second segment and above said first segment, said segments being arranged to form between the ends thereof a rigid continuous bicycle receiving trough which extends generally horizontally, then upwardly and finally in a reverse direction over a portion of the generally horizontal section of the trough, said trough being adapted to receive bicycle wheels therein with a portion of said first segment adjacent said one end of said first segment together with said second segment and said third segment forming a bicycle wheel receiving and retaining formation preventing removal of the bicycle by upward movement of the bicycle wheel, with said third segment extending above a portion of one wheel of said bicycle, and said channel member further includes a locking strap for securing a bicycle to said channel member said locking strap being pivotally secured at one end to said first segment, and which has at least one hole therein near the other, free end thereof and which is movable between a generally horizontal position juxtaposed with said first segment and an angularly upwardly extending position where a leg of a padlock can be inserted through said hole.

4,015,719

FLOATING NET DISPLAY APPARATUS

Irwin Hanopole, West Orange, N.J., assignor to Magla Products, Irvington, N.J.

Filed Jan. 6, 1975, Ser. No. 538,474
Int. Cl.² A47F *1/06*
U.S. Cl. 211—133 **10 Claims**

1. A display apparatus comprising:
a flexible net adapted to receive display materials therein, said net having a multi-sided shape and including a center and a plurality of corners;
a mast having a top and a bottom end, said mast passing approximately through the center of said net, said net being attached to said mast; and,
a base means attached to the bottom end of said mast for providing free-standing support to said mast, said flexible net substantially surrounding at least part of said mast and said corners of said net being brought up and being attached to said mast to form a bag-like configuration.

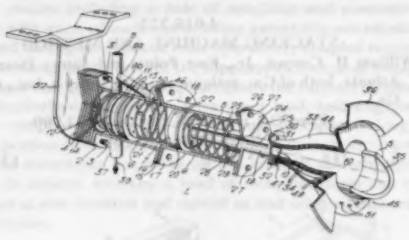
4,015,720

COUPLING DEVICE FOR PNEUMATIC BRAKE LINES

Jack Peché, Johannesburg, South Africa, assignor to Achille George Richman, London, England, a part interest

Filed Oct. 28, 1975, Ser. No. 626,701
Claims priority, application South Africa, Oct. 28, 1974, 74/6799; Oct. 28, 1974, 74/6799A
Int. Cl.² B60T *7/12*
U.S. Cl. 213—1.3 **13 Claims**

1. Apparatus for coupling pneumatic brake lines of vehicles comprising: an axially and resiliently compressible tubular projection attachable to a vehicle to extend outwardly parallel to the vehicle draught axis to its free end; a valve for controlling flow of air between a brake line of the vehicle and the bore of the projection; means to bias the valve so that it is closed when the projection is fully extended and open when the projection has been axially compressed to a predetermined extent; and a head at the free end of the projection formed to align and



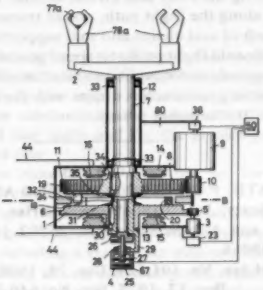
connect substantially airtightly with a similarly formed head of an opposing projection of like apparatus attached to an adjacent vehicle when the vehicles are coupled, which coupling action compresses both projections to the predetermined extent.

4,015,721

PROGRAMMABLE DEVICE FOR MECHANICALLY EXECUTING WORK PROCESSES

Holger Scheler, Klausdorf, Schwentine, Germany, assignor to Hagenuk vormals Neufeldt & Kuhnke GmbH, Kiel, Germany

Filed Aug. 25, 1975, Ser. No. 607,431
Claims priority, application Germany, Sept. 6, 1974, 2442865
Int. Cl.² B25J *9/00*
U.S. Cl. 214—1 BB **37 Claims**



1. A programmable device for mechanically executing work processes, more particularly, a handling device having moving elements consisting of a series of mutually coupled rotating or displacement elements, wherein the moving element situated at the one end is associated with a production unit while the moving element situated at the other end has a tool mounted thereon, characterized in that the moving elements (**79, 79', 80**) consist of load-independent programmable auxiliary positioning gears (**3, 5, 6, 1, 20; 3', 5', 46, 41, 60**) and of load-dependent follow-up positioning gears (**10, 11, 8, 19, 2; 10', 51, 42,59, 2'**), wherein the programmable auxiliary positioning gear has stops (**20; 60**) for a positioning member (**2; 2'**); said load-dependent follow-up positioning gears having a contact member (**19, 59**) cooperating with said stops to position said positioning member, and a follow-up drive (**9; 9'**) for driving said follow-up gears at a velocity controlled by the distance between said stops and said contact member without loading said auxiliary positioning gear, said stops being connectable in a force-locking manner with a stationary housing part (**12; 12'**) and said positioning member (**2; 2'**) being

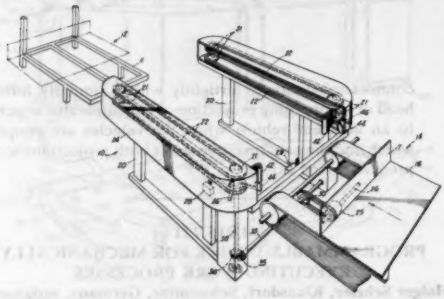
moved to a position determined by the stops (**20; 60**) of the auxiliary positioning gear by the follow-up gear in synchronism therewith through the intermediary of a speed control means (**4; 4'**).

4,015,722

STACKING MACHINE AND METHOD

William H. Cooper, Jr., East Point, and James Dean Cobb, Atlanta, both of Ga., assignors to McKenney's, Inc., Atlanta, Ga.

Filed Oct. 16, 1975, Ser. No. 622,990
Int. Cl.² B65G *57/14*
U.S. Cl. 214—6 D **13 Claims**



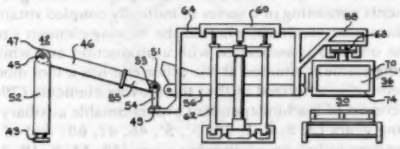
6. A machine for stacking articles adjacent the end of a conveyor adapted to be driven at a predetermined speed comprising, in combination, a pair of sprockets horizontally mounted to each side of a horizontal article flight path extending from an end of the conveyor; an endless chain mounted to each of said pairs of sprockets aside the flight path; means mounted to said endless chains for vertically supporting and for propelling between said chains articles received from the conveyor along the flight path; power transmission means for driving each of said chains and said supporting and propelling means aside said flight path at a speed greater than said predetermined speed; and coupling means for selectively coupling and uncoupling said endless chains with the conveyor through said power transmission means.

4,015,723

AUTOMATIC PALLETIZER METHOD AND APPARATUS

Thomas Beaty, Jr., 20180 Whipple Drive, Northville, Mich. 48167, and Asib S. Samander, 25802 Jeanette, Roseville, Mich. 48066

Division of Ser. No. 101,529, Dec. 28, 1970. This application Dec. 12, 1975, Ser. No. 640,240
Int. Cl.² B65G *57/24*
U.S. Cl. 214—6 P **1 Claim**



1. Apparatus for stacking articles in successive interlocking layers upon a stationary pallet comprising:

a transport frame,

a loading head rotatably connected to said transport frame,

means for moving said transport frame along a first axis for selectively loading portions of said pallet,

means for moving said transport frame along a second axis perpendicular to said first axis for selectively loading portions of said pallet,

means for rotating said loading head for stacking, in conjunction with each of said moving means, a first layer of articles on said pallet,

means for vertically raising said transport frame and said loading head for stacking successive layers on said pallet, said loading head located directly below said rotating means, and

said means for vertically raising said transport frame comprises:

a side transport frame, and

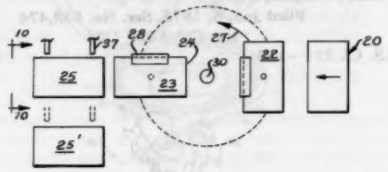
a hoist frame supported by said side transport frame and supporting said transport frame so that said transport frame and said loading head move together as an integrated element.

4,015,724

METHOD AND APPARATUS FOR HANDLING SUBSTACKS OF BUSINESS FORMS TO DEVELOP BALANCED STACKS

Harvey J. Spencer, Green Bay, Wis., assignor to Paper Converting Machine Company, Green Bay, Wis.

Filed Aug. 21, 1975, Ser. No. 606,650
Int. Cl.² B65G *57/16*
U.S. Cl. 214—6.5 **3 Claims**



1. Apparatus for handling substacks of business forms to develop balanced stacks for packing comprising:

a frame,

means on said frame for assembling forms at the end of a delivery path into a series of substacks each having a predetermined number of forms therein,

means on said frame for rotating alternate substacks 90° in one direction and for rotating the other alternate substacks 90° in the opposite direction,

pusher means on said frame for advancing the rotated substacks into a stacking station, said rotating means including a shaft having a vertical axis and a relatively elongated support member at the top thereof, means operably associated with said shaft for oscillating the same 180° in opposite directions to alternately place one end of said support member adjacent said assembling means while the other end is adjacent said stacking station, two platforms rotatably mounted on said support member, one for each end thereof, and drive means for each platform for rotating the same 90° for each 180° of rotation of said shaft, and

means on said frame responsive to the accumulation of a predetermined number of substacks in said stacking station for moving a stack of forms into a packaging station.

4,015,725

PIVOTABLE AND EXTENDABLE APPARATUS FOR LIFTING A PERSON TO AND FROM A VEHICLE

John Patrick Ryan, and Jack B. Hart, both of Indianapolis, Ind., assignors to Marion County Muscular Dystrophy Foundation, Indianapolis, Ind.

Filed Aug. 28, 1975, Ser. No. 608,507
Int. Cl.² B60P *1/44*
U.S. Cl. 214—75 R **9 Claims**

1. An apparatus for lifting a handicapped person to and from a vehicle comprising:

a post fixedly mounted within said vehicle with said post having a top end;

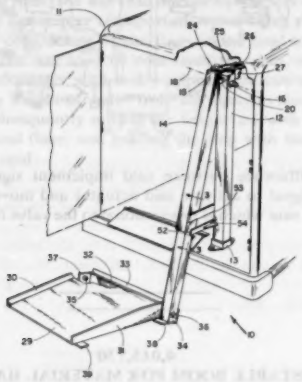
a channel pivotally mounted about a horizontal pivot axis to said top end of said post with said channel having a bottom end swingable outwardly of said vehicle;

a member slidably and telescopically mounted to said channel;

a platform movably mounted to said member;

first means mounted to said vehicle for swinging said member and said platform outwardly from and clear of said vehicle; and,

second means connected to said channel and to said member for extending said member to position said platform



on ground and also for retracting said member to cooperate with said first means to position said platform within said vehicle, said first means includes a bridge pivotally mounted to said vehicle, said bridge when pivoted to a horizontal position has a length extending outwardly of said vehicle to said platform allowing movement of a wheelchair from within said vehicle across said bridge to said platform, said bridge including an abutting surface engaging and thus pivoting said first channel outwardly from said vehicle when said bridge is pivoted to said horizontal position, further said second means is constructed such that said second member can only be extended by operation of said second means.

4,015,726

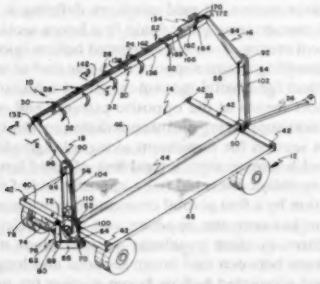
HAY LOADER

Clinton F. Baker, 109 S. 8th St., Fredonia, Kans. 66736

Filed Mar. 17, 1975, Ser. No. 559,028

Int. Cl.² B60P *1/48*

U.S. Cl. 214—77 R **15 Claims**



1. In load handling apparatus, a horizontal and elongated support member having a spatial orientation of its longitudinal extent, power means drivingly connected to opposite ends of the support member for laterally translating the latter selectively in all directions normal to the extent of the support member throughout a three-dimensional zone while positively maintaining the longitudinal spatial orientation thereof, said power means including a pair of rotatable and concentric shafts, with each of such shafts being essentially coextensive with and having its opposite ends operatively coupled respectively to the opposite ends of the support member, load engaging means extending along and carried by the support member for selectively engaging and releasing a load, said engaging means comprising a plurality of engaging units spaced along a major portion of the longitudinal extent of the support member, and means for operating all the units of said engaging means in unison, whereby a load of elongated form can be engaged at one location and moved to and released at a second location.

4,015,727

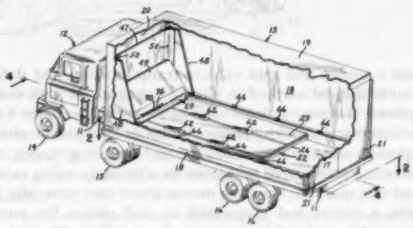
TRUCK UNLOADING DEVICE

Howard Dwight Rezac, 403 Spencer St., Gregory, S. Dak. 57533

Filed Aug. 6, 1975, Ser. No. 602,279

Int. Cl.² B60P *1/00*

U.S. Cl. 214—82 **6 Claims**



1. In a vehicle box having laterally spaced side walls, a floor, and front and rear ends, unloading apparatus comprising:

a. a platform having an upper material supporting surface extending for substantially the full width of the space between said side walls and for the greater part of the length of said box;

b. roller means mounting the platform for forward and rearward movements on said floor;

c. means for imparting rearward material discharge movements and forward return movements to said platform;

d. wall means including a transverse wall structure;

e. means including a carriage and guide means therefor mounting said wall means above said platform for forward and rearward movements in said box;

f. inter-engaging means on said platform and carriage for imparting movements to said wall means in a rearward material discharging direction responsive to said rearward material discharge movement of said platform;

g. and releasable means for holding said wall means against forward movement thereof during forward return movement of the platform.

4,015,728

MATERIAL HANDLING APPARATUS

Noble G. Barker, Pekin, Ill.; John E. Corwin, Portland, Ind.; Jimmy D. Myers, Morton, Ill., and Jan B. Yates, Reynoldsburg, Ohio, assignors to Caterpillar Tractor Co., Ill.

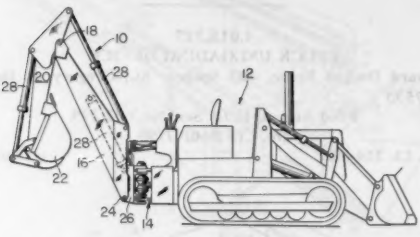
Filed Feb. 24, 1975, Ser. No. 552,393

Int. Cl.² E02F *3/32*

U.S. Cl. 214—138 G **4 Claims**

1. A material handling apparatus, comprising: a boom including first and second elongated arms; means pivotally interconnecting said boom arms; a material handling means;

means pivotally connecting said material handling means to one of said boom arms; a bifurcated yoke; means pivotally connecting the other of said boom arms to said yoke, said yoke having a pair of vertically spaced, generally horizontally extending arms; a vehicle frame portion for mounting said yoke; means pivotally interconnecting said yoke arms to said vehicle frame portion for rotation about a generally vertical axis; a vertically disposed, double-acting cylinder having an internal, vertically reciprocal piston and supported by said yoke arms; means securing said cylinder against rotation to said vehicle frame portion; a coupling device secured to at least one of said yoke arms and having a first splined surface; means carried by said piston and movable therewith and having a second splined surface slidably engaging said first splined surface; means carried by said piston and movable therewith and defining a third splined surface; means carried by one of



said cylinder and said vehicle frame portion and defining a fourth splined surface in sliding engagement with said third splined surface; at least one said splined surfaces having a helical pitch whereby reciprocation of said piston within said cylinder will cause rotation of said coupling device thereby effecting rotation of said yoke to ultimately swing said boom and said material handling means about said generally vertical axis; a piston rod connected to said piston for movement therewith, said rod having an end extending exteriorly of said cylinder; said second and third splined surfaces are located on said rod end; said vehicle frame portion including a journal assembly pivotally mounting one of said yoke arm and constituting said means pivotally interconnecting said yoke arms to said vehicle frame portion; said journal assembly including a bore slidably receiving said piston rod end, the interior of said bore being provided with said fourth splined surface.

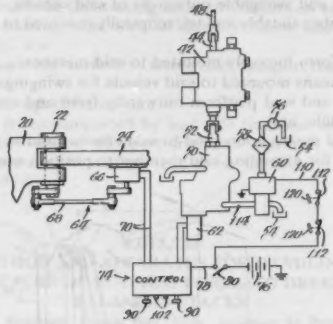
4,015,729

AUTOMATIC CONTROL SYSTEM FOR BACKHOE

Donald J. Parquet; Carl O. Pedersen, both of Burlington, and Robert M. Barton, Davenport, all of Iowa, assignors to J. I. Case Company, Racine, Wis.

Filed Jan. 2, 1976, Ser. No. 646,035
Int. Cl.² E02F *3/32*
U.S. Cl. 214—138 R **7 Claims**

1. In a vehicle having a frame and a material handling implement pivoted about a pivot axis on said frame by hydraulic motor means with a reservoir and pressurized fluid source connected to said motor means through a control valve having a valve spool movable in opposite directions from a neutral position to actuate said motor means, and a position setting means for automatically setting the position of said implement with respect to said frame, the improvement of said position setting means comprising an actuator having an output connected directly to said valve spool with said pressurized fluid source connected to said actuator, an actuating element for activating said actuator, a position indicating means between said frame and implement, said position indicating means having an implement signal having a value which is the function of the angular position of said implement on said frame, control means for receiving said implement signal, said control means having a manually settable control element producing a control signal having a value which is the function of the desired angular setting of said implement on said frame, said control means producing an output signal supplied to said actuating element and having a value which is proportionate



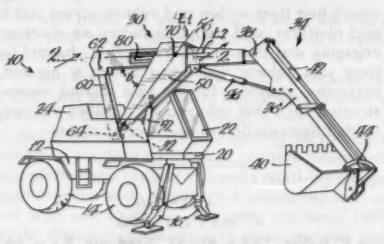
to the difference between said implement signal and said control signal to activate said actuator and move said implement at a rate which is proportional to the valve of said output signal.

4,015,730

ADJUSTABLE BOOM FOR MATERIAL HANDLING IMPLEMENT

William D. Symmank, Schofield, Wis., assignor to J. I. Case Company, Racine, Wis.

Filed Nov. 24, 1975, Ser. No. 634,921
Int. Cl.² E02F *3/38*
U.S. Cl. 214—141 **7 Claims**



1. A mobile excavator comprising a selfpowered frame structure; a platform revolvable about a vertical axis on said frame structure; a boom including a first elongated boom section; pivot means on said platform defining a horizontal pivot with one extreme end of said first boom section pivoted on said pivot means; a second elongated hollow boom section; material handling means supported on one end of said second boom section for pivotal movement about a horizontal pivot axis; support means at the opposite extreme end of said first boom section supporting an intermediate portion of said second boom section for movement along a longitudinal axis of said second boom section; a rigid link of fixed length having one end pivotally connected to an opposite end of said second boom section by a first pivotal connection; a horizontal pivotal connection between the opposite end of said rigid link and said platform in close proximity to said pivot means; and power means between said boom sections and located within said second elongated hollow boom section for moving said second boom section relative to said support means to change the location of said one end of said second section with respect to said opposite extreme end of said first boom section.

4,015,731

PREPARATION OF A WET LOAD OF COAL FOR TRANSPORT AND STORAGE

Eke Verschuur, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 513,968, Oct. 11, 1974, Pat. No. 3,957,456. This application Nov. 20, 1975, Ser. No. 633,891
Claims priority, application United Kingdom, Oct. 23, 1973, 49214/73
Int. Cl.² B63B 27/24
U.S. Cl. 214—152 2 Claims

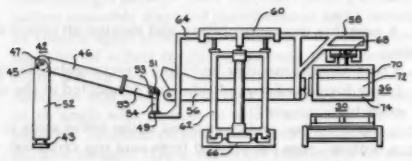
1. A method of transporting coal by ship, in which the ship is loaded with a wet load of coal prepared from an aqueous slurry of coal fines, the wet load of coal having less water than the slurry to economize transportation and being resistant to settling and compacting of the fines in the coal to facilitate removal of the wet load of coal from the ship, comprising preparing briquettes with a dry appearance containing less then 20% by weight of water from the aqueous slurry of coal fines and subsequently mixing the briquettes with a mass of water and coal fines, and loading the ship with the resulting wet load of coal.

4,015,732

AUTOMATIC PALLETIZER METHOD AND APPARATUS

Thomas Beaty, Jr., 20180 Whipple Drive, Northville, Mich. 48167, and Asib S. Samander, 25802 Jeanette, Roseville, Mich. 48066

Division of Ser. No. 101,529, Dec. 28, 1970. This application Dec. 12, 1975, Ser. No. 640,238
Int. Cl.² B65G 57/24
U.S. Cl. 214—152 1 Claim



1. A method of stacking articles in successive interlocking layers upon a stationary pallet comprising the steps of:

conveying articles to be stacked along a linearly extendable conveyor to a transport frame supported by a hoist frame, said transport frame having a loading head rotatably connected thereto;

moving said transport frame along a first axis for selectively loading portions of said pallet;

moving said transport frame along a second axis perpendicular to said first axis for selectively loading articles on portions of said pallet;

rotating said loading head for stacking, in conjunction with each of said steps of moving, a first layer of articles on said pallet;

raising said hoist frame for stacking successively higher layers on said pallet; and

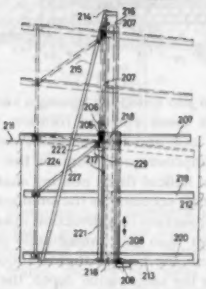
moving said extendable conveyor in response to movement of said transport frame supported by said hoist frame.

4,015,733

DEVICE FOR STORAGE OF MOTOR VEHICLES

Otto Woehr, Sr., Korntal, and Wolfgang Woehr, Muenchingen, both of Germany, assignors to MPB Metall- and Parksystem-Bau GmbH, Korntal, Germany

Filed Jan. 29, 1975, Ser. No. 545,022
Claims priority, application Germany, Feb. 1, 1974, 2404833
Int. Cl.² E04H 6/06
U.S. Cl. 214—16.1 ED 12 Claims



1. A device for storage of motor vehicles, comprising:

a. a frame member adapted for placement on a floor level located below an adjacent entrance plane for said motor vehicles, and including centrally positioned, vertically extending, telescopically arranged fixed and sliding rail means;

b. at least two generally horizontally oriented, separate platforms arranged one above the other;

c. Connecting rod means pivotally connected to said platform and extending generally vertically therebetween for maintaining said platforms in substantially parallel relationship;

d. pivot means pivotally connecting each of said platforms generally centrally thereof to said sliding rail means on said frame member, whereby to permit rotation of each of said platforms about a horizontal axis, said connecting rod means maintaining said platforms in substantially parallel relationship during such rotation;

e. raising and lowering means operatively connected between said frame member and said platforms for raising and lowering said platforms simultaneously between a lower position wherein one end of the uppermost platform is positioned substantially level with an adjacent said entrance plane, and an upper position wherein one end of the lowermost platform is positioned substantially level with and adjacent said entrance plane;

f. means for connecting said raising and lowering means to at least one of said platforms for causing tilting of both platforms simultaneously in substantially parallel relationship about their respective pivot means in cooperation with the connecting rod means when the raising and lowering means is actuated to raise the platforms towards their upper position, said lowermost platform having the end thereof adjacent said entrance plane higher than the opposite end of said lowermost platform when said lowermost platform is in its upper position;

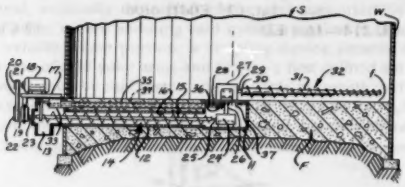
g. means to limit the rotational movement of the platforms about their respective pivot means; and

h. means engageable with at least one of said platform to cause said platforms to rotate back to a generally level position in their lowermost position.

4,015,734
SWEEP AUGER FOR BOTTOM SILO UNLOADERS

Jonathan J. Laidig, Mishawaka, Ind., assignor to Laidig Silo Unloaders, Inc., Mishawaka, Ind.

Filed Aug. 14, 1975, Ser. No. 604,655
Int. Cl.² B65G 65/46
U.S. Cl. 214—17 DA 7 Claims

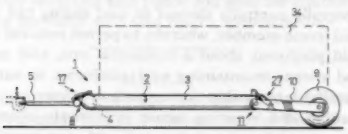


1. In a bottom silo unloader having a sweep auger drivingly supported at its inner end for rotation about a transverse related vertical axis and for simultaneous rotation about its own axis, the improvement wherein the sweep auger comprises a series of helical flight bearing shaft sections of which the outermost shaft section has the smallest diameter and each succeeding shaft section in a direction inwardly therefrom has a larger diameter than the immediately preceding shaft section, and wherein the helical flights about each of the shaft sections all have the same radial depth, the loading capacity of the channels between the flights of each succeeding shaft section being larger than that to the preceding shaft section.

4,015,735
MEANS FOR CHANGING THE POSITION OF A LOAD-CARRYING COMPONENT OF A TRANSPORT UNIT

Kjell Berglund, Revingevagen 4, S-240 35 Harlosa, and Signar Nordlund, Bjarshog, S-212 90 Malmo, both of Sweden

Filed Mar. 7, 1975, Ser. No. 556,298
Claims priority, application Sweden, Mar. 15, 1974, 7403485
Int. Cl.² B60P 3/00
U.S. Cl. 214—313 12 Claims



1. A transport device comprising:

a. a U-shaped main frame comprising two longitudinal, generally parallel side members, and a cross member connecting the side members at the front thereof, said side members having load engaging means thereon for supporting a load therebetween, the rear end of said U-shaped main frame being open to permit the rear portion of said load to project rearwardly of said members;

b. a swingable fore frame member pivotally connected to said cross member;

c. a pair of swingable rear frame members, one of said rear frame members being pivotally connected to the rear end of each of said side members and forming an extension thereof;

d. first power actuating means connected between said cross member and said swingable fore frame, and operable for pivoting the foreward end of said main frame between raised and lowered positions;

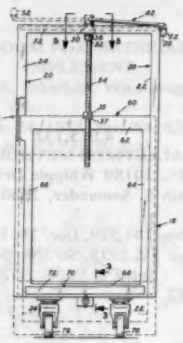
e. second power actuating means connected between the rear ends of said side members and said swingable rear frame members, and operable for pivoting the rear end of said main frame between raised and lowered positions, said swingable rear frame members extending downwardly at an angle from said side members when said rear end of said main frame is in a raised position, and pivoting upwardly toward a position wherein they are in general alignment with said side members as said rear end of said main frame pivots from its raised position toward its lowered position; and

f. gripping means on at least one of said swingable rear frame members disposed rearwardly of the rear end of its associated side member, and adapted to engage said projecting rear portion of a load supported between side members when said rear end of said main frame is in a position beneath its raised position, whereby when said second power actuating means is operated to raise said rear end of said main frame said projecting rear portion of said load will be carried downwardly by said downwardly pivoting rear frame members, thereby effecting an upward tilting of the foreward end of said load.

4,015,736
PORTABLE DEVICE FOR LIFTING AND MOVING AN OBJECT

Earl R. Erickson, R.R. 5, Box 550, Grand Rapids, Minn. 55744

Continuation of Ser. No. 531,857, Dec. 12, 1974, abandoned. This application Feb. 12, 1976, Ser. No. 657,616
Int. Cl.² B60P 3/40
U.S. Cl. 214—390 1 Claim



1. A portable device for lifting and moving an object comprising:

a. a first support member including a rectangular stationary frame formed of spaced side bars connected at the upper ends to

b. a top cross bar and connected at the lower ends to

c. a bottom cross bar spaced from said top cross bar,

d. a movable inverted U-shaped frame having spaced side channel members connected at the top by a top cross member,

e. said stationary frame side members positioned within the side channel members of said movable frame for slidable movement of said movable frame on said stationary frame,

f. a foot connected to the free end of each of said side channel members,

g. said side channel members connected at one end to a top cross member, and of a length greater than that of said spaced side bars of said stationary frame so as to be extendable below said bottom cross bar to a position upon a surface upon which the device is placed for engagement of said foot members under an object to be lifted,

h. means connected to said top cross bar of said stationary frame and said top cross member of said movable frame for slidably lifting said movable frame upon and relative

to said stationary frame whereby said foot members raise an object positioned thereon, said means including a screw member threadedly engaged at one end to said top cross bar of said stationary frame and rotatably mounted on said top cross member of said movable frame, and a handle connected to said screw member for rotation of the same,

i. a second support member identical to said first support member, and

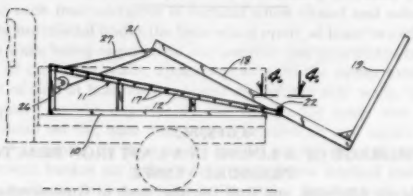
j. adjustable flexible means connected to said first and second support members for maintaining said first and second support members in close proximity to an object positioned thereon for moving.

4,015,737

BALE MOVER

Harold G. Wright, Scranton, and Richard J. Gordon, Grand Junction, both of Iowa, assignors to Scranton Manufacturing Company, Inc., Scranton, Iowa

Filed May 19, 1975, Ser. No. 578,534
Int. Cl.² B60P 1/16
U.S. Cl. 214—501 **1 Claim**



1. Apparatus for loading and unloading objects comprising:

a framework rigidly connected to a vehicle;

track means rigidly connected to said framework, said track means having one end lower than the other end thereof, the lower end of said track means having stop means thereon, said track means including a first pair of spaced apart straight parallel track members having a plurality of rollers rotatably disposed therebetween and a second pair of spaced apart straight parallel track members having a plurality of rollers rotatably disposed therebetween;

a frame having two fork members connected thereto adjacent one end thereof, said fork members being disposed at an angle with respect to said frame, said frame being movably mounted on said track, said frame including two parallel straight frame members connected to said fork members and disposed at right angles with respect thereto, and means for connecting said two straight frame members together, said rollers being disposed below the top sides of the first and second pair of straight track members whereby said frame members extend between said track members and thereby guided by said straight track members;

projection means connected to said frame intermediate the ends thereof for contacting said stop means and thereby preventing the frame from moving off of the track means; and

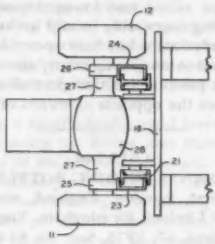
actuating means interconnecting a portion of the other end of said frame and a portion of said framework for controlling the movement of said frame with respect to said framework, said actuating means including a winch connected to said framework and a cable connected to said winch at one end and to said framework at the other end thereof, a pulley connected to said frame and said cable being disposed around one side of said pulley.

4,015,738

MATERIAL-HANDLING APPARATUS

Christian D. Gibson, and Kenneth F. Hart, both of Greene, N.Y., assignors to The Raymond Corporation, Greene, N.Y.

Continuation of Ser. No. 443,952, Feb. 20, 1974, abandoned.
This application Apr. 13, 1976, Ser. No. 676,564
Int. Cl.² B66F 9/20
U.S. Cl. 214—674 **18 Claims**



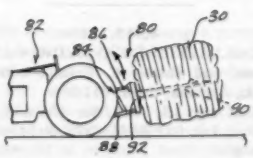
1. A lift truck, comprising, in combination: a base frame having a forward edge; a pair of rigid housings affixed to said base frame and extending forwardly therefrom at opposite sides of said base frame, thereby providing a space between said housings; a pair of drive wheels journalled in respective ones of said rigid housings on an axis near the forward ends of said rigid housings; a pair of motors mounted on said base frame rearwardly from said forward edge of said base frame and connected by flexible power-transmission means to respective ones of said housings near the rearward ends of said housings; a respective plurality of gear means inside each of said housings for connecting said drive wheels to said motors; a vertically-extending mast assembly carrying a load carriage; a load-engaging means carried on said load carriage to support a load forwardly from the axis of said drive wheels; a pair of mounting blocks, each of said mounting blocks being located above and fixedly secured to the top of a respective one of said housings, each of said mounting blocks having a plurality of longitudinally-spaced bores, said mast assembly including a pair of laterally-extending stub shaft members mounted near its lower end, said stub shaft members being adapted to pivotally seat within selected pairs of said bores further the top of each of said housings is provided with a seat having three mutually-perpendicular surfaces, each of said mounting blocks being adapted to be bolted atop a respective one of said housings to engage the three surfaces of said housing.

4,015,739

HAY BALE HANDLING MACHINE

Randal A. Cox, R.R. 1, Van Wert, Iowa 50262

Filed Oct. 23, 1974, Ser. No. 517,434
Int. Cl.² E02F 3/62
U.S. Cl. 214—766 **18 Claims**



1. A pickup truck mounted round bale handling machine comprising,

a pickup truck having a frame and a cab and a rearwardly disposed box on said frame including opposite sidewalls, a front end wall, a bed, and an open rear end,

a round bale hay handling machine having a base frame

operatively secured to said truck frame at the rear open end of said box,

a single elongated hay support finger member pivoted at one end to said base frame and being pointed at the other end for penetrating a bale of hay along its center longitudinal axis and supporting the bale along the length of said support finger and said support finger being positioned on the longitudinal centerline axie of said truck bed, and

power means connected to said hay support finger for pivoting it between raised and lowered positions with said finger extending rearwardly in said lowered position and adapted to penetrate a hay bale upon said truck moving rearwardly, and extending upwardly above said truck bed in said raised position for transport of a hay bale positioned between the opposite sidewalls of said truck box.

4,015,740

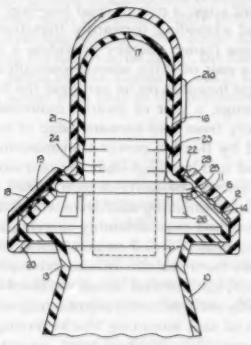
INFANTS FEEDING BOTTLE

Eric Kenneth Hurst, London, England, assignor to Lewis Woolf Griptight Limited, Birmingham, England

Filed Sept. 17, 1975, Ser. No. 614,061

Int. Cl.² A61J *9/00*

U.S. Cl. 215—11 C **4 Claims**



1. An infants feeding bottle comprising a container for liquid having an outlet opening surrounded by seating, a resilient teat having an outlet orifice, the teat having a portion secured onto the seating of the container by an attachment part, a teat cap enclosing the teat and connected to the attachment part by a severable portion, and a closure member frictionally engaged in the interior of the teat and arranged to be dislodged therefrom, to allow access between the interior of the container and the interior of the teat by manipulation of the cap while the cap still encloses the teat, said cap being movable, after severing of said severable portion between the cap and the attachment part, in a direction towards the interior of the container to exert pressure on the closure member, through the teat, and dislodge said closure member from the teat into the interior of the container.

4,015,741

COLLAPSIBLE CARRYING CASE

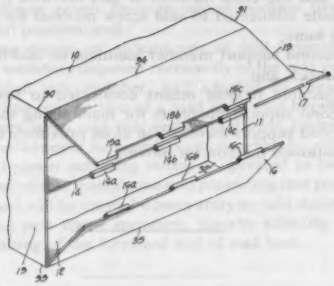
Carl E. Frahm, and Shirley E. Frahm, both of 1428 Oak Meadow Rd., Arcadia, Calif. 91106

Filed Aug. 15, 1975, Ser. No. 605,161

Int. Cl.² B65D *7/24, 9/14*

U.S. Cl. 220—6 **1 Claim**

1. A collapsible case having a pair of end walls and a pair of side walls and two flaps serving as the bottom for the case, a divider in said case, said divider and said flaps each having alignable openings, and a pin extending through said alignable openings, said end walls are hinged on corresponding ones of said side walls and said flaps are hinged on a corresponding one of said side walls, and said pin being removable from said alignable openings in said divider and in said flaps to allow said divider to be detached from said flaps and to allow said flaps to hinge on said side walls and said end walls to hinge on said side walls such that said end walls, side walls, and flaps



may be folded to assume a general planer flat structure with said divider sandwiched therein between said end walls and said side walls.

4,015,742

ANCHORAGE OF A LINING IN A CAST IRON REACTOR PRESSURE VESSEL

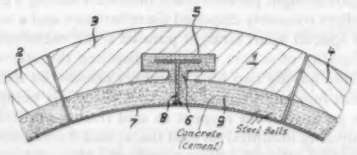
Wolfgang Albrecht, and Rolf Dörling, both of Gummersbach, Germany, assignors to L. & C. Steinmuller GmbH, Gummersbach, Germany

Filed Aug. 18, 1975, Ser. No. 605,264

Claims priority, application Germany, Aug. 19, 1974, 2439706

Int. Cl.² B65D *25/18;* **G21C** *13/08*

U.S. Cl. 220—9 A **3 Claims**



1. In combination with a reactor pressure vessel of a nuclear power station having pressure-tight lining composed of individual cylindrical segments: a substantially cylindrical outer cast iron pressure container coaxially surrounding said lining in radially spaced relationship thereto, and composed of individual cast iron segments parallel to the longitudinal axis of said lining, each of said last mentioned segments having a recess, communicating with the space between said lining and said pressure container, a plurality of anchors of a T-shaped cross section respectively arranged in said recesses so that the stem and the transverse bar of said T-shaped cross section are spaced from the walls of the respective recess and the stem of said T-shaped cross section engages the respective adjacent cylindrical segment of said lining and is connected thereto, said anchors being substantially parallel to the longitudinal axis of said lining, and filler material filling the space between said lining and said container and completely surrounding said T-shaped anchors to fill the spaces in said recesses.

4,015,743
CONTAINERS MADE IN METALLIC WIRES

Oscar Beretta, Neuilly(Seine), France, assignor to Societe Anonyme a Responsabilite Limitee: Technifil, Neuilly-sur-Seine, France

Continuation-in-part of Ser. No. 405,654, Oct. 11, 1973, Pat. No. 3,917,103. This application Aug. 15, 1975, Ser. No. 605,206

Int. Cl.² B65D 7/20, 7/24, 21/02

U.S. Cl. 220—19 10 Claims

1. A collapsible metal wire basket comprising a hollow base including a bottom and fixed edge walls secured to said bottom and extending perpendicular thereto, side walls mounted on the top of said edge walls of the base, a door in at least one of said side walls, means pivotably connecting said door to the base such that said door is vertical when closed and substantially horizontal under the base when open, at least two of said side walls being opposed to one another and articulated to the top of said edge walls, upper supports on the upper external part of said at least two opposed articulated side walls, lower supports on the exterior of the fixed edge walls and feet mounted on the base and shaped relative to said upper and lower supports for selectively resting on the supports on an identical basket such that when baskets are stacked and the side walls are folded into the hollow base, the feet rest on the lower supports of the identical basket and when the side walls are erect the feet rest on the upper supports of the identical basket.

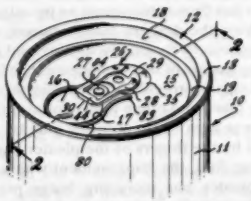
4,015,744
EASY-OPEN ECOLOGY END

Omar L. Brown, Dayton, Ohio, assignor to Ermal C. Fraze, Dayton, Ohio

Continuation of Ser. No. 625,820, Oct. 28, 1975, abandoned. This application Mar. 24, 1976, Ser. No. 670,084

Int. Cl.² B65D 41/32

U.S. Cl. 220—269 24 Claims



1. An easy-opening end structure for use with a container comprising:

and end wall of sheet material including a chuck wall terminating in a peripheral flange positioned vertically above a center panel section and a groove located at the base of the chuck wall and extending vertically below said center panel section;

means in said center panel section defining a pour panel at least partially circumscribed by a scoreline to form an opening in said center panel section;

tab means including a lifting end and an opening end;

means to affix said tab means to said center panel section such that the opening end thereof overlies said pour panel whereby said tab remains fixed to said central panel section after formation of said opening;

said scoreline including a portion located between the opening end of said tab and said affixing means and defining a generally circular pour panel;

said tab including spaced side legs interconnected at the forward end by a cross-member including finger means to bear against said panel during an opening sequence,

said cross-member of said tab being in chordal relation to said scoreline;

said tab being a longitudinally rigid lever operative in response to raising the lifting end thereof to cause the opening end of the tab to bear against said panel and to lift on said affixing means thereby lifting the portion of center panel surrounding said affixing means to initiate rupture of the portion of the scoreline located between the opening end of the tab and the affixing means by a shearing action; and

said tab being operative in response to raising the lifting end thereof to urge said panel downwardly to effect rupture of the remainder of the scoreline.

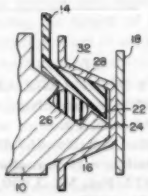
4,015,745
REUSABLE SEAL WITH THERMAL EXPANSION COMPENSATION

Amedio D. Petrangelo, Webster, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Continuation of Ser. No. 423,931, Dec. 12, 1973, abandoned. This application Sept. 22, 1975, Ser. No. 615,522

Int. Cl.² B65D 45/32

U.S. Cl. 220—320 4 Claims



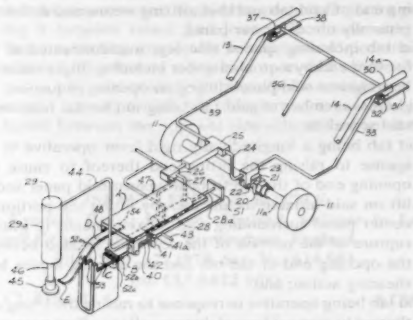
1. A resealable container comprising a generally circular base of metal, a plastic cover fittable on said base for defining in conjunction therewith an enclosed chamber, an annular flange integral with said cover and extending radially outwardly therefrom at the end of the cover that is normally closed by the base, said flange being flared outwardly in thickness and its diameter at ordinary room temperature being slightly less than the diameter of the base, and a V-groove ring assembly for retaining the flange of said cover in engagement with the base, said V-groove ring being shaped to define in conjunction with a radially outer portion of the base a chamber generally congruent with said flange, said ring having a circumferential wall portion of approximately the same diameter as said base for restraining said flange from expanding outwardly beyond the edge of said base.

4,015,746

FASTENER POSITIONING DEVICE

Edward L. Thomas, 25 Queen Anne Road, Greenville, S.C. 29607

Filed Jan. 26, 1976, Ser. No. 652,298
Int. Cl.² B65H *3/36*
U.S. Cl. 221—263 **7 Claims**



1. A device for feeding fasteners having an enlarged impact receiving head and an elongated shank portion extending outwardly from an intermediate position thereof to a fastener receiving means comprising:

a housing;

an elongated member slidably carried by said housing;

a notch at one end of said elongated member open at an end and side of said elongated member receiving a fastener supporting the head with the shank projecting through the notch;

retaining means carried by said housing engaging said head remote from the shank maintaining said fastener within said notch;

means moving said elongated member forwardly while said retaining means engages said head maintaining said fastener within said notch for positioning the fasteners for reception by the fastener receiving means prior to retracting the elongated member permitted by said notch open at an end releasing said shank portion formerly disposed therein.

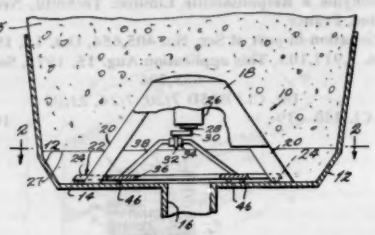
4,015,747

GRAVITY DISCHARGE APPARATUS

Frank J. Miksitz, Phillipsburg, N.J., assignor to Universal Feeders, Inc., Bethlehem, Pa.

Continuation-in-part of Ser. No. 467,558, May 6, 1974, Pat. No. 3,874,566, which is a continuation-in-part of Ser. No. 216,105, Jan. 7, 1972, Pat. No. 3,809,286. This application Mar. 31, 1975, Ser. No. 563,453
The portion of the term of this patent subsequent to May 7, 1991, has been disclaimed.
Int. Cl.² B65G *65/48*
U.S. Cl. 222—1 **4 Claims**

1. A method for discharging granular material by gravity assist from an upper zone containing an annular mass of the granular material which is supported on a bottom wall of the zone and which is disposed below a shroud, said bottom wall having a discharge opening therein located below the shroud, said method comprising disposing a horizontal annular plate below the shroud and above said bottom wall in a position such that at least a portion of the granular material in the annular mass thereof resides on the upper surface of the plate, orbiting the plate in a horizontal plane relative to said discharge opening in a manner to urge granular material from the annular mass thereof inwardly to the periphery of the aperture in the plate and thereafter through the discharge opening along a path which moves in a horizontal plane around the



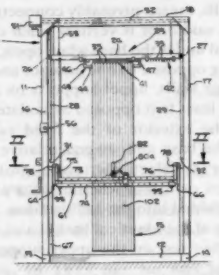
periphery of the aperture, and periodically reversing the direction of the orbit of the plate.

4,015,748

DRAPERY PLEATING AND FINISHING MACHINE

Steven T. Golden, 822 Teague Drive, Santa Paula, Calif. 93060

Filed May 26, 1976, Ser. No. 690,066
Int. Cl.² A41H *43/00*; D05B *35/08*
U.S. Cl. 223—32 **22 Claims**



1. In an apparatus for pleating and stretching draperies in which an upstanding frame carries a horizontally disposed hanger bar for securing an upper end of a drapery, and a pleater bar assembly vertically movable on said frame, said pleater bar assembly including first and second horizontally disposed elongated pleater bars mounted on said carriage means, the second pleater bar having a plurality of longitudinally spaced laterally outwardly extending pleating fingers, said first pleater bar having a plurality of longitudinally spaced laterally outwardly extending inner and outer nested normally coplanar pleating fingers alternately mounted relative to said second pleater bar fingers to assume an interdigitated relationship for combing the drapery therebetween, manually operated means for selectively axially shifting said inner and outer nested pleating fingers of said first pleater bar for clamping the folds of the drapery on both sides of said second pleater bar fingers by the inner and outer fingers of said first pleater bar, whereby a lower hem of the drapery may be neatly and uniformly locked by the fingers of the pleater bars on both sides of each drapery fold, the improvement which comprises:

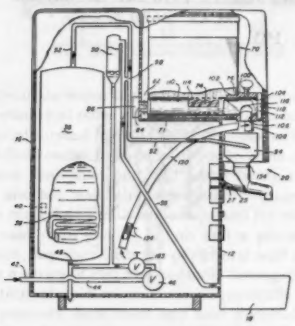
said first pleater bar including bulge preventing means thereon for initially contacting only the inner area of said drapery at the forward ends of the fingers of said second pleater bar when said manually operated means is actuated to clamp said folds thereby allowing the drapery to shaft about said nested fingers as actuation of said operating means clamps said folds so that the drapery material between said nested fingers conforms to the fingers of said first pleater bar in the back portion of said drapery fold adjacent the forward ends of the fingers of said second pleater bar before the entire drapery fold is clamped

between said nested fingers upon actuation of said operating means to thereby prevent formation of a bulge in said drapery folds between the forward ends of said fingers of said first pleater bar and said second pleater bar when in clamped position.

4,015,749
HOT COFFEE DISPENSER

William A. Arzberger, Medfield, and Edward J. Lalumiere, Woburn, both of Mass., assignors to Jet Spray Cooler, Inc., Waltham, Mass.

Continuation-in-part of Ser. No. 464,220, April 25, 1974, abandoned. This application Apr. 3, 1975, Ser. No. 564,772
Int. Cl.² B67D *5/30*
U.S. Cl. 222—70 **15 Claims**

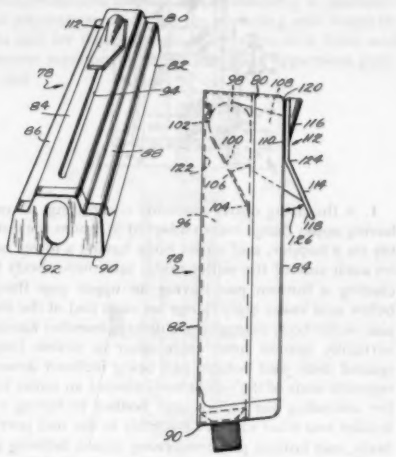


1. A coffee dispensing machine comprising:
a housing and a hot water tank in said housing,
a hopper assembly comprising a hopper for containing powder coffee concentrate on said housing,
an outlet passage in the bottom portion of said hopper assembly for discharging selected amounts of powder coffee from said hopper,
a mixing assembly mounted on said housing adjacent said outlet passage and positioned to receive both powder discharged through said passage and water from the tank,
a heat conducting block formed of good heat conducting material and surrounding said outlet passage and when heated maintaining the outlet passage and region in the hopper assembly adjacent the passage hot and dry,
a heat tube having a discharge end disposed adjacent the outlet passage,
heating means in the housing causing heated air to flow through the tube to its discharge end to heat said block and outlet passage,
a deflector connected to the block immediately adjacent the outlet passage,
said heating means being operatively associated with the block for heating the block and passing a stream of heated air to said block in a direction toward said deflector whereby said deflector prevents powder discharged through the passage from flying around the discharge region,
and said outlet passage being formed in said block.

4,015,750
PASTE DISPENSING DEVICE

Arthur Lloyd Wilston, 300 Redington Road, Troy, Pa. 16947

Continuation-in-part of Ser. No. 566,325, April 9, 1975, Pat. No. 3,974,943. This application May 4, 1976, Ser. No. 683,237
Int. Cl.² B65D *35/28*
U.S. Cl. 222—103 **4 Claims**



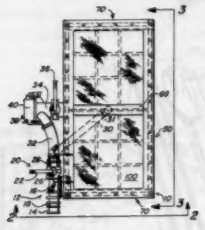
1. Apparatus for dispensing material contained in a collapsible tube comprising:
a plurality of walls including a top and a bottom wall and first and second end walls connected together to define a housing enclosure for the tube, said first end wall having an aperture for receiving the neck of the tube, said top wall extending between said end walls, said top wall having a raised central portion and opposite sides, said central portion extending the length of said housing, a slot formed in said central portion of said top wall extending between said end walls, a planar shoulder portion extending from each side of said central portion with said shoulder portions extending the length of said housing substantially perpendicular to said side walls,
a press member slidably disposed in said housing, said press member having a flat top surface having outer parallel side edges each being immediately adjacent and engageable with said shoulder portion so as to be slidable thereon, said press member including a leading edge and a rear portion both extending between said outer parallel side edges, a base located adjacent said rear portion, and perpendicularly spaced from said top surface, a pressing surface extending from said leading edge to said base,
said top surface of said press member having a handle stem extending substantially perpendicularly therefrom through said slot in said top wall of said housing, said handle stem having a manually engageable portion fixed thereto exteriorly of said housing, said manually engageable portion having a leading section and a trailing section with said trailing section extending parallel to said top surface of said press member and with said leading section extending at an angle relative to said trailing section.

4,015,751

QUICK CHANGE FLUIDIZING OUTLET ASSEMBLY

Dallas W. Rollins; Robert W. Randolph, both of St. Charles, and Gerald D. Garner, Florissant, all of Mo., assignors to ACF Industries, Incorporated, New York, N.Y.

Filed July 2, 1975, Ser. No. 592,500
Int. Cl.² B65G *69/06*
U.S. Cl. 222—195 **13 Claims**



1. A fluidizing outlet assembly comprising: an outlet body having upper flange means adapted to mount the outlet assembly on a hopper; said outlet body having a lower body flange on each side of the outlet body; said outlet body further including a bottom pan having an upper pan flange spaced below said lower body flange on each end of the outlet body; said outlet body comprising a unitary member having portions vertically spaced from each other to define longitudinally spaced slots; said bottom pan being inclined downwardly on opposite ends of the outlet body toward an outlet in said body for unloading the lading, and further including a fluidizing header and filter support assembly in the mid portion of said body; said bottom pan comprising means defining a fluidizing plenum in fluid communication with said fluidizing header; said filter support assembly having means adapted to engage and support at least a pair of filter assemblies; each assembly engaging said outlet body on one end of the outlet body and on at least one side of the outlet body; each filter assembly engaging said filter support assembly in the mid portion of said body; each of said filter assemblies comprising a filter member and a lower supporting member; each of said filter assemblies being separately readily removable from said outlet body whereby another filter assembly may be quickly inserted into said outlet body.

4,015,752

RAPID CHARGING VALVE FOR A PRESSURIZED DISPENSER

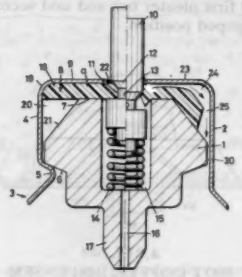
Herbert Meuresch, Wiesbaden, and Tilo Patenge, Hattersheim, both of Germany, assignors to Precision Valve Corporation, Yonkers, N.Y.

Filed Jan. 27, 1976, Ser. No. 652,729
Claims priority, application Germany, Jan. 29, 1975, 2503626
Int. Cl.² B65D *83/14*
U.S. Cl. 222—402.16 **7 Claims**

1. In a valve for a pressurized dispenser, said valve having a mounting cup, a valve housing immovable relative thereto and a gasket for sealing a discharge passage, the gasket being clamped between a rim of said housing and an adjacent wall of the mounting cup, said mounting cap having a pedestal portion comprising an end wall and a circumferential wall and a filling aperture in the end wall radially outward of the discharge passage and only inward of the clamping rim, the improvement which comprises

said gasket having an annular clamped region, a peripheral edge having portions which extend to contact a surrounding wall separated by other portions which do not contact the surrounding wall, and a marginal portion between the peripheral edge and the clamped region, and

a clearance space below the marginal portion of the gasket to accommodate the marginal portion so that the marginal portion may radially stretch and deflect during



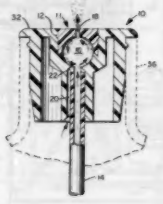
filling to provide a flow passage along the adjacent wall surfaces over the gasket, past the clamped region and around the peripheral edge of the gasket.

4,015,753

DIP TUBE POWDER SPRAY CONTROL DEVICE

Robert Bennett, 170 Sturbridge Road, Easton, Conn. 06425

Filed Mar. 17, 1976, Ser. No. 667,480
Int. Cl.² B65D *83/06*
U.S. Cl. 222—193 **6 Claims**



1. A device comprising:

a first vertical hollow conduit open at top and bottom ends, said conduit having a circular cross section with a first diameter;

a hollow spherical chamber having a second diameter substantially larger than the first diameter and disposed above the first conduit; the top end of the first conduit being connected to and communicating with the bottom of the chamber;

a second vertical hollow conduit disposed above the chamber, said second conduit having a circular cross section with a third diameter smaller than said first diameter and open at top and bottom ends, the bottom end of the second conduit being connected to and communicating with the top of the chamber, the top end of the second conduit constituting a discharge port;

a third vertical hollow conduit open at top and bottom ends and disposed alongside of the first conduit, the third conduit having a circular cross section, the diameter of the third conduit being substantially equal to the third diameter, said third conduit having an open bottom and disposed above the bottom end of the first conduit and having an open top end disposed below the top end of the first conduit; and

a fourth inclined hollow conduit open at both ends, the top end of the third conduit being connected to the lower end of the fourth conduit, the upper end of the fourth conduit being connected to said chamber and communicating therewith, said fourth conduit having a circular cross section, the diameter of the fourth conduit having a circu-

lar cross section, the diameter of the fourth conduit being substantially equal to said third diameter.

4,015,754

DOSING DEVICE WITH PNEUMATIC DISCHARGE FOR FLOWABLE SOLIDS

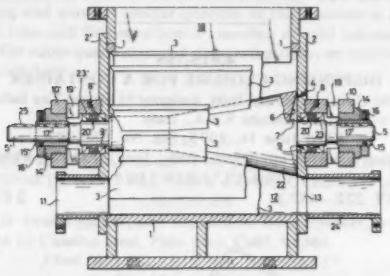
Gerardus Cornelis Leurs; Rumoldus Matthijs Marinos Johannes Bosma, both of Breda, and Theodorus Johannes Antonius Pouw, Gilze, all of Netherlands, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 12, 1975, Ser. No. 586,153

Claims priority, application Germany, June 14, 1974, 2428579

Int. Cl.² B65G *53/40*

U.S. Cl. 222—194 **4 Claims**



1. A particulate material feeding device comprising a casing having a cylindrical rotor chamber therein, an inlet for particulate material formed in said casing, a pressure fluid inlet and a material-fluid outlet formed in opposite walls of said casing, said pressure fluid inlet and said outlet being axially aligned with one another and circumferentially spaced from said particulate material inlet, a rotor mounted for rotation in said chamber, said rotor having a hub and a plurality of radial blades which, together with the peripheral wall of said chamber, define a series of circumferentially arranged pockets that upon rotation of said rotor come sequentially into registry with said pressure fluid inlet and said material-fluid outlet, said rotor hub having an outer surface that diverges in the direction of the outlet wall of said casing to cause the cross-sectional area of said pockets to decrease between said pressure fluid inlet and said material-fluid outlet, said outlet being of such size and configuration as to register simultaneously with at least two of said rotor pockets, whereby no part of said outlet obstructs any part of the discharge end of a pocket in registry therewith.

4,015,755

ELECTROMAGNETICALLY ACTUATABLE METERING VALVE FOR SUCCESSIVE DELIVERY OF MEASURED VOLUMES OF FLUID FROM A FLUID RESERVOIR

Edward Lerner, 3 Marshall St., Irvington, N.J. 07111, and John A. Ventura, 32 Jefferson St., Nutley, N.J. 07110

Filed Dec. 12, 1975, Ser. No. 640,069

Int. Cl.² G01F *11/30*

U.S. Cl. 222—442 **6 Claims**

1. An electromagnetically operable metering valve for the successive delivery of measured volumes of fluid of a predetermined density from a fluid reservoir comprising:

an elongated, hollow valve body closed at the top and the bottom and defining an interior valve cavity;

fluid inlet means communicating with said cavity proximal to said top of said body;

fluid discharge means proximal to said bottom of said cavity;

a valve core of predetermined material seated in said cavity, movable toward and away from said top and said bottom of said body;

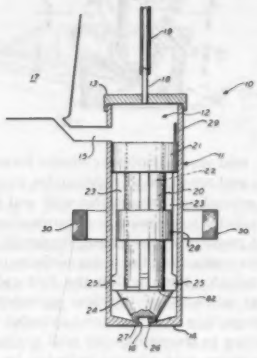
first closure means on said core, proximal to said top thereof, and operably engageable with said inlet means to effect a seal of said inlet means when said core is moved to an uppermost position;

second closure means on said core proximal to said bottom thereof operatively engageable with said discharge means to effect a seal of said discharge means when said core is moved by gravity to a lowermost position;

magnetic means operatively connected to said valve core;

electromagnetic means positioned proximal to said valve body and at a predetermined position with respect thereto;

said electromagnetic means for establishing a predetermined electromagnetic field for attracting said magnetic means and for thereby urging said valve core from said lowermost position upwardly into said uppermost position; and



said valve core of said predetermined material being of a predetermined weight such that: (i) said predetermined electromagnetic field is insufficient alone to move said valve core from said lowermost position upwardly into said uppermost position, (ii) upon said valve body being filled with said fluid the buoyant effect of said fluid on said valve core is insufficient alone to overcome said gravity and move said valve core out of said lowermost position, and (iii) the combined buoyant effect of said fluid on said valve core upon said fluid filling said valve body and the establishment of said predetermined electromagnetic field are required to move said valve core from said lowermost position upwardly into said uppermost position thereby preventing delivery of said fluid from said metering valve unless said valve body is filled with said fluid.

4,015,756

SPOUT FOR SWIVEL-SPOUT DISPENSING CLOSURES

James M. Beck, Carol Stream, Ill., assignor to U.S. Cap & Closure, Inc., Chicago, Ill.

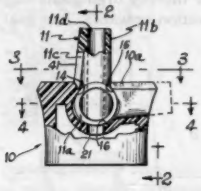
Continuation-in-part of Ser. No. 414,262, Nov. 9, 1973, abandoned. This application Oct. 10, 1975, Ser. No. 621,429

Int. Cl.² B67D *3/00*

U.S. Cl. 222—534 **6 Claims**

1. In the combination of a container and a dispensing closure having a base and a swivel-spout mounted in the top of said base, at least one of said base and said swivel spout being of a resilient but generally shape retaining material, the base being adapted to be attached to a container for flowable material, the spout having a nozzle connected to a cylindrical knuckle pivotally engaged by a "snap fit" with a plurality of complementary bearing openings in the base, a portion of said openings coacting with the outer surface of said knuckle in sealing relationship, said spout being adapted for pivotal movement between "on" and "off" positions to permit flow of

the material and interruption thereof respectively, a bore in said nozzle extending through the knuckle, passage means in said base adapted to provide fluid communication between the interior of said container and said spout, said bore, when registered with said passage through the base by said pivotal movement to the "on" position providing fluid communication between the interior of the container and the exit end of the bore, an improvement in the spout in which said spout comprises first and second hollow cylinders, the first cylinder forming the knuckle with a wall of resilient but generally shape retaining material which will deform to the degree necessary when said knuckle is inserted into said bearing openings with a "snap fit" and regain its cylindrical form after



said insertion, said second hollow cylinder forming said nozzle with said bore and arranged at right angles to said first hollow cylinder and extending through the wall and interior of said first hollow cylinder to provide communication between said bore and said passage in said base, diametrically positioned web-like means connecting the outer surfaces of the portion of said second cylinder lying within the first cylinder with the adjacent inner surfaces of the first cylinder, the web-like means and the portion of said second cylinder within said first cylinder coacting to strengthen the wall portions of said first cylinder containing said second cylinder to which a force necessary to pivot the spout is applied, the remaining hollow wall portions of said first cylinder on each side of said second cylinder remaining resilient.

4,015,757

RAPID CHARGING VALVE FOR A PRESSURIZED DISPENSER

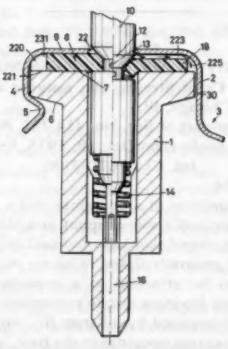
Herbert Meuresch, Wiesbaden; Steven Padar, Kelkheim, and Franz Zimmerhackel, Hattersheim, all of Germany, assignors to Precision Valve Corporation, Yonkers, N.Y.

Filed Jan. 27, 1976, Ser. No. 652,730

Claims priority, application Germany, Jan. 29, 1975, 2503626

Int. Cl.² B65D *83/00*

U.S. Cl. 222—402.16 **7 Claims**



1. In a valve for a pressurized dispenser, said valve having a mounting cup, a valve housing immovable relative thereto and an annular gasket for sealing a discharge passage, said mounting cup having a pedestal portion comprising an end wall and a circumferential wall and a filling aperture in the end wall radially outward of the discharge passage and only inward of the clamping rim, a region of the gasket being clamped between a rim of said housing and said end wall the improvement which comprises

clearance space means adjacent the outer marginal portion of the gasket to accommodate the marginal portion so that the marginal portion may radially stretch during filling to provide a flow passage along the adjacent wall surfaces over the gasket, past the clamped region and around the peripheral edge of the gasket, and

a plurality of spacer means extending between said housing and said end wall located radially outwardly of the gasket perimeter to define the axial distance between said clamping rim and said end wall.

4,015,758

DISPENSING CLOSURE FOR A CONTAINER

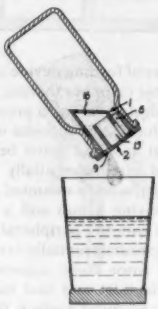
Claudio Cavazza, Rome, Italy, assignor to Sigma-Tau Industrie Farmaceutiche/Riunite S.p.A., Italy

Filed June 16, 1975, Ser. No. 586,927

Claims priority, application Italy, June 17, 1974, 51562/74

Int. Cl.² G01F *11/26*

U.S. Cl. 222—457.5 **2 Claims**



1. A dispensing closure for a container comprising, a tubular element having a tubular body insertable axially snugly into a neck of a container for being substantially wholly housed therein and having a shoulder about an open top end thereof and a bottom wall partially closing an opposite bottom end, said bottom wall being inclined relative to the axis of said tubular body and terminating in an upstanding wall extending into said tubular body and spaced inwardly from an inner wall surface of the tubular body and extending partially into the interior of said tubular body defining jointly with said inner wall surface a bottom inlet providing in use communication of the interior of said container with the interior of said tubular element, a second element assembled with the first element having a top in use snugly on said shoulder closing partially the open top end of said tubular element and defining a top outlet opening in said tubular element and spaced in a circumferential direction from the bottom inlet into the interior of said tubular element, said second element having a wall extending from said top spaced inwardly from said upstanding wall defining jointly therewith a chamber interiorly of said tubular body having an opening confronting said inner wall surface of said tubular element and in communication with said bottom inlet, said bottom wall being inclined toward said upstanding wall to define a second chamber in communication with the first-mentioned chamber and disposed between the bottom wall and the first chamber and bounded by inner surfaces of said bottom wall and said tubular body, the second element wall extending into the interior of said tubular body between said upstanding

wall and another inner wall surface of the tubular body opposite the first-mentioned inner wall surface and disposed spaced axially inwardly from said bottom wall and spaced from said another inner wall surface of the tubular body opposite the first-mentioned inner wall surface thereof and defining therewith an outlet providing communication between the interior of said second chamber and said top outlet opening, whereby when said dispensing closure is mounted on a container for dispensing the content thereof and said container is inverted from an upright position a quantity of said contents enters into the interior of said tubular element through said bottom inlet into the first-mentioned chamber and when said container is returned to an upright position the same quantity of contents is retained in said second chamber of said tubular element and upon reinverting of said container with the closure thereon the quantity of contents in said chamber of said tubular element is dispensed from said second chamber through said top outlet opening and another similar quantity of the contents is introduced into said first-mentioned chamber of said tubular element for subsequent metered dispensing upon reinverting of said container

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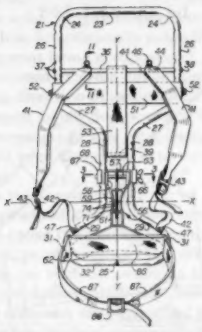
4,015,759

BACKPACK FRAME HAVING SHOULDER AND HIP SUPPORTS WITH FLEXIBLE CONNECTION TO HIP SUPPORT

Peter D. Dreissigacker, and Richard A. Dreissigacker, both of 4224 El Camino Real, Palo Alto, Calif. 94306

Filed May 27, 1975, Ser. No. 580,557
Int. Cl.² A45F *3/10*
U.S. Cl. 224—25 A **15 Claims**



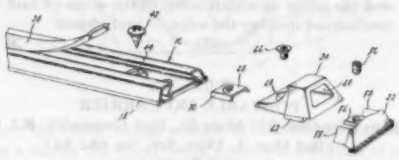
1. A backpack frame comprising a rigid member of extended length adapted to extend along the back of the wearer having an upper portion, a middle portion below said upper portion, and a lower portion below said middle portion, said middle portion generally fitting between the shoulder blades and the waist of the wearer, a pair of shoulder straps, each said shoulder strap having an upper end and a lower end, upper end fastening means to attach each said upper end to said upper portion, lower end fastening means to attach each said lower end to said lower portion, a hip engaging belt to encircle the hips of the wearer, and a connector, said connector being vertically elongated, first means rigidly connecting the upper end of said connector to said middle portion, second means attaching the lower end of said connector to said belt, said connector having third means on its upper end adapted for cooperative engagement with said first means, a narrow portion below said third means, a horizontally elongated stretcher below said narrow portion shaped to fit behind the hips of the wearer and having fourth means for cooperative engagement with said second means, said stretcher being rigid relative to said narrow portion but resilient about a vertical axis to apply tension to said hip engaging means to maintain said stretcher out of contact with the back of the wearer, said narrow portion having at least two generally vertically extending ribs, said ribs being thin in a horizontal-transverse direction and being wide in a horizontal-longitudinal direction, whereby said narrow portion can flex about a vertical axis and also about a horizontal-longitudinal axis but resists rotation about a horizontal-transverse axis so that said stretcher does not move toward and away from the wearer in a horizontal-longitudinal direction.

4,015,760

VEHICLE ARTICLE CARRIER

John A. Bott, 931 Lake Shore Drive, Grosse Pointe Shores, Mich. 48236

Filed Aug. 14, 1975, Ser. No. 604,644
Int. Cl.² B60R *9/00*
U.S. Cl. 224—42.1 D **7 Claims**



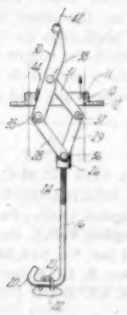
1. In a luggage rack, a slat made from a roll formed strip of metal and having a pair of upwardly converging inner walls defining an upwardly open dovetail groove therebetween, a web portion connecting the lower ends of said inner walls and providing a means of connection to a vehicle body surface, outer walls spaced on opposite sides of said inner walls, a pair of horizontal supporting walls on opposite sides of said groove connecting the upper ends of an inner wall and an outer wall on one side of said groove and an inner wall and an outer wall on the other side of said groove, said inner and outer walls forming downwardly presenting channels and cooperating to support the weight of a load positioned on said supporting walls, and an article securing member on at least one end of said dovetail groove for receiving means for securing an article on said slat, said article securing member being adjustably fastened to said slat.

4,015,761

SPARE TIRE LOCKING MECHANISM

Gerald Kokko, 21051 Delaware, Southfield, Mich. 48075

Filed Aug. 16, 1973, Ser. No. 389,019
Int. Cl.² B62D *43/10*
U.S. Cl. 224—42.24 **2 Claims**



1. An apparatus for selectively retaining an object relative to a mounting device, comprising, in combination:
an object having at least one aperture therethrough;
first means being adapted to be inserted through said aperture in said object and being adapted to be secured at one end thereof to said mounting device;

second means being adapted to be connected on said first means for selectively retaining said object in a predetermined position relative to said mounting device; and

said second means being capable of changing its profile relative to said aperture in said object so that said profile has at least one dimension greater than the largest cross-sectional dimension of said aperture when said object is to be retained in said predetermined position, and so that said profile has all of its dimensions less than the smallest cross-sectional dimension of said aperture when said object is to be moved relative to said first means, and

wherein said second means is a quadrilateral-type toggle mechanism capable of changing its dimension relative to the cross-sectional dimension of the aperture in said object so that said toggle mechanism is capable of forming at least two positions, one of which at least two arms of said toggle mechanism overlap the edge of said object and the other of which none of the arms of said toggle mechanism overlap the edge of said object.

4,015,762

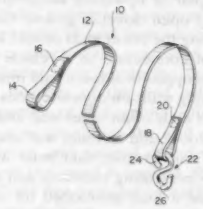
PORTABLE SKI CARRIER

Anthony Mendillo, 901 Main St., East Greenwich, R.I. 02818

Filed Mar. 1, 1976, Ser. No. 662,843

Int. Cl.² B65D *69/00*

U.S. Cl. 224—45 S **4 Claims**



1. A portable device for carrying skis, comprising an elongated flexible strap, on one end of which a loop is formed and on the other end of which a hook is secured, said strap being unencumbered along the length thereof and the loop end of said strap being wrapped around an end of said skis and receiving the remaining portion of said strap therethrough, wherein said remaining portion is pulled in tightened relation on one side of the bindings of said skis to lock said loop end around the end of said skis, the hook end of said strap being wrapped around the other end of said skis to leave said hook exposed, the portion of said strap adjacent to said hook being received therein and pulled relative thereto to lock said strap in tightened relation on the other side of said bindings, wherein said loop and hook ends are located in spaced relation relative to each other, the length of said strap extending between the secured loop and hook ends defining a carry portion for portably transporting said skis.

4,015,763

ALIGNMENT PAWL FOR FILM-CARRIER ADVANCE MECHANISM

Alan S. Keizer, Huntingdon Valley, Pa., assignor to The Jade Corporation, Huntingdon Valley, Pa.

Continuation-in-part of Ser. No. 510,207, Sept. 30, 1974. This application Dec. 5, 1975, Ser. No. 637,921

Int. Cl.² B65H *17/40*

U.S. Cl. 226—55 **8 Claims**

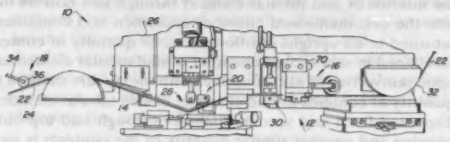
1. Apparatus for sequentially positioning individual lead frames on a lead frame film-carrier at a bonding site, said lead frame film-carrier having sprocket holes therein, comprising;

means for guiding a lead frame film-carrier to and from a bonding site;

feed means for intermittently advancing said film-carrier in a forward longitudinal direction;

biasing means for biasing said film-carrier in a reverse longitudinal direction opposite to the direction of advance by said feed means, said biasing means placing said film-carrier under minimal tension;

pawl means cooperating with said sprocket holes for accurately positioning individual lead frames in both the lateral and longitudinal directions at the bonding site, said pawl means being stationary with respect to said film-carrier; and



said feed means including means for over-advancing said film-carrier in the forward longitudinal direction from a home position and then releasing said film-carrier so that said biasing means moves said film-carrier in the reverse longitudinal direction until said pawl means engage said sprocket holes thereby positioning said film-carrier at the bonding site while said film-carrier is under minimal tension.

4,015,764

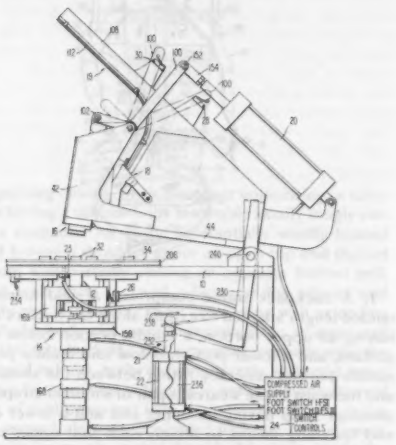
SOLID STATE CHIP INSERTION APPARATUS

David John Durney, Holland, Pa., assignor to Burroughs Corporation, Detroit, Mich.

Filed May 30, 1975, Ser. No. 582,350

Int. Cl.² B27F *7/08*

U.S. Cl. 227—118 **10 Claims**



1. Solid state chip insertion apparatus comprising:

chip insertion means including means arcuately movable from a chip receiving position to a chip insertion position for inserting a solid state chip into a printed circuit board;

means for individually releasing said chips from a supply so as to move by gravity to said insertion means;

means mounting a printed circuit board for adjustable positioning movement adjacent to said chip insertion means;

detent template means carried by said printed circuit board mounting means for guiding said board to a predetermined chip location in rows and columns without visual alignment of said board and said chip;

operator controlled means operably associated with said chip insertion means for actuating said insertion means

effective to insert a chip into said printed circuit board; and

clinching means for deforming the contacts of said chips to retain the chips within said printed circuit board so as to prevent accidental dislodgement therefrom after insertion of the chips into and through the board prior to soldering.

4,015,765

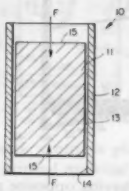
FORMATION AND UTILIZATION OF COMPOUND BILLET

Nazeer Ahmed, Princeton, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Filed May 10, 1976, Ser. No. 685,000

Int. Cl.² B23P *11/02*

U.S. Cl. 228—131 **5 Claims**



1. A method of forming a compound billet, wherein a solid, longitudinally extending first member, composed of aluminum, is retained firmly within a hollow, longitudinally extending second member, composed of copper, the method comprising the steps of:

a. providing a solid, longitudinally extending first element within a hollow, longitudinally extending second element, said first element being composed of aluminum and having predetermined external dimensions in a plane perpendicular to the direction of longitudinal extension, and said second element being composed of copper and having internal dimensions in said perpendicular plane at least equal to said predetermined external dimensions of the first element;

b. applying to the longitudinal ends of the solid, first element a longitudinal compressive stress of a magnitude sufficient to cause the first element to deform plastically outwardly, perpendicularly to said direction of longitudinal extension, to such an extent as to cause the second element also to deform plastically outwardly, perpendicularly to said direction of longitudinal extension; and then

c. releasing the longitudinal compressive stress at the longitudinal ends of the first element and allowing the first and second elements to relax inwardly, such that a tendency toward a greater degree of relaxation strain in the copper, second element will cause the second element to grasp firmly the exterior of the aluminum, first element, thereby forming said compound billet.

4,015,766

PACKAGE OF FIBER MATERIAL OR OTHER RESILIENT MATERIAL FOR RECEIVING FRAGILE ARTICLES, PARTICULARLY EGGS

Jørgen Nilaus Petersen, Lyngby, Denmark, assignor to Aktieselskabet Brodrene Hartmann, Lyngby, Denmark

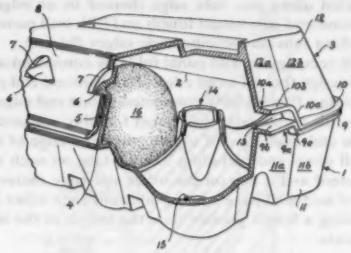
Filed Nov. 19, 1975, Ser. No. 633,259

Claims priority, application Denmark, Jan. 27, 1975, 251/75

Int. Cl.² B65D *1/36*

U.S. Cl. 229—2.5 EC **4 Claims**

1. A package for receiving fragile articles such as eggs which package comprises a base member having two opposite end walls and two opposite side walls, a top member having two opposite end walls and two opposite side walls, said top member being hinged along one of its side walls to one of the side walls of said base member, at least the end walls of said top and bottom member having outwardly extending flanges, the intermediate portion of said end walls being displaced inwardly of said members with respect to the outer end portions of said walls, the flanges of said top and bottom members in the region of said intermediate displaced portions having their flanges offset transversely of the major plane of said



members, the offset flange portion of one of said members forming a recess, the offset flange portion of the other of said members forming a projection, said projection in the closed condition of said package being engaged within said recess to maintain alignment of said members laterally, and the terminal edges of said offset portions being located in substantially the same vertical plane as the terminal edges of the adjoining flanges.

4,015,767

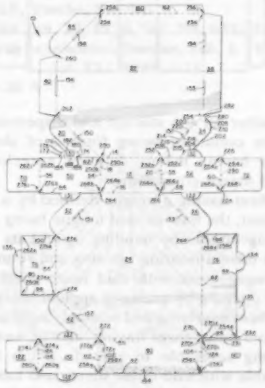
CONTAINER

Roger G. Ferriter, Yonkers, N.Y., assignor to Wix Corporation, Gastonia, N.C.

Filed May 5, 1976, Ser. No. 683,634

Int. Cl.² B65D *5/06*

U.S. Cl. 229—16 R **15 Claims**



1. An integral foldable container blank, comprising:

a first rectangular wall panel;

a first polygonal end panel foldably connected along one edge thereof to one side edge of said first wall panel, said end panel having an adhesive receiving flange foldably attached to another edge thereof, and a plurality of tongues foldably connected to the other edges thereof, said tongues having locking tab receiving apertures defined therein;

a second polygonal end panel foldably connected along one edge thereof to the other side edge of said first wall panel, and having a plurality of tongues foldably connected thereto at other edges thereof;

second and third rectangular wall panels each having a flap foldably connected to an end edge thereof and each connected along the other end edge thereof to an end edge of said first wall panel;

fourth and fifth rectangular wall panels each foldably connected along one side edge thereof to an edge of said second end panel, said fourth and fifth wall panels having locking tabs on the other side edges thereof;

a sixth rectangular wall panel foldably connected along one side edge thereof to an edge of said second end panel and having a flap foldably connected to one end edge thereof;

a seventh rectangular wall panel foldably connected along one end edge thereof to the other end edge of said sixth wall panel and including locking tabs on each side edge thereof and a flap on the other end edge thereof;

two of said wall panels being adjacent each other and each having a length greater than the length of the other wall panels.

4,015,768
SEALED END CARTON WITH RECLOSABLE POURING OPENING

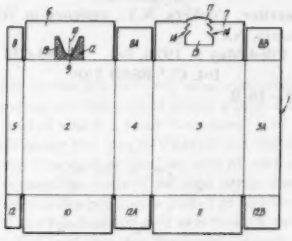
Noel McLennan, Mount Waverly, Australia, assignor to Nicholas Proprietary Ltd., Australia

Filed July 23, 1975, Ser. No. 605,374

Claims priority, application Australia, July 23, 1974, 8293/74; Nov. 27, 1974, 9789/74

Int. Cl.² B65D *5/72*

U.S. Cl. 229—17 R **7 Claims**



1. A container for the storage and dispensing of pourable materials, the container being formed of sheet packaging material and having means defining a reclosable pouring opening, said means comprising:

an inner sheet having a tongue defined by a cut line in the inner sheet, the base of said tongue being free of scoring and being liftable by bending against its inherent resiliency to form a pouring opening and returnable for frictional engagement with said inner sheet to close said pouring opening by pressure applied thereto;

an outer sheet overlying and sealingly adhered to said inner sheet, said outer sheet having lines of weakness defining and being severable to provide a tab frictionally re-engageable with said outer sheet, said tab overlying said tongue and part of said inner sheet with its base overlying the base of said tongue, said tab being adhered to said tongue but substantially unadhered to said inner sheet so as to be hingedly liftable from said inner sheet;

said container being openable by hingedly lifting said tab whereby said lines of weakness are severed and said tongue is hingedly lifted to form said pouring opening, and reclosable by pressing said tab against said inner sheet whereby said tab frictionally engages said outer sheet and said tongue is pressed into frictional re-engagement with said inner sheet, said lines of weakness defining said tab comprise a series of unconnected cuts constituting a zig-zag pattern extending to the edge of the outer sheet, a hinge crease or score line being provided at the base of said tab, said container is a box-shaped carton.

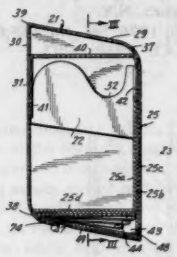
4,015,769
CIGARETTE BOX OR PACKAGE

Shlomo Erlich, 1740 Clement St., San Francisco, Calif. 94121

Filed Jan. 30, 1976, Ser. No. 653,788

Int. Cl.² B65D *5/66*

U.S. Cl. 229—44 CB **17 Claims**



1. A cigarette box having opposite pairs of wider and narrower walls, and having at its top a three-sided insert projecting above one of the narrower and adjacent wider walls of the box and comprising a relatively narrow end wall and front and rear walls extending laterally therefrom, said end wall and the laterally extending front and rear walls of the insert provided with open cutouts therein separated by corner sections, said insert being disposed within and extending below the upper edges of the said one narrower and side walls of the box the box having a closure hinged to the opposite narrow wall of the box, whereby upon opening of the closure, the insert and its cutouts are exposed and enable the cigarettes to be removed by being gripped wth the aid of thumb and finger pressure from any two of three directions and mangling of the tops of the cigarettes thereby avoided.

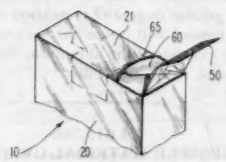
4,015,770
PACKAGING

Bernard J. Tamarin, The Philadelphian, 1C 41, 2401 Pennsylvania Ave., Philadelphia, Pa. 19130

Filed July 24, 1975, Ser. No. 598,699

Int. Cl.² B65D *17/16*

U.S. Cl. 229—51 C **10 Claims**



1. Cigarette package comprising a rectangular access end surface covered by an inner wrapper folded thereover and by an outer sheath overlying the wrapper, with arcuate slits in superposition extending through both wrapper and sheath substantially across the end surface from one wide side edge to the opposite wide side edge about one-third of the length thereof from one narrow side edge and curving theretoward, and a generally rectangular pull tab substantially covering the portion of the end surface bounded by the narrow end, the slit, and the intervening segments of the wide side edges, the pull tab adhering to such end portion and covering and sealing the

slit and terminating in a nonadherent pull portion adjacent the slit.

4,015,771

PACKAGING BAG OF THERMOPLASTIC SYNTHETIC PLASTIC FILM

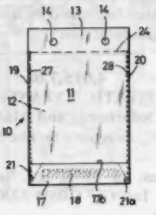
Karl Heinz Sengewald, Kuensebeck, Germany (4801)

Filed Dec. 29, 1975, Ser. No. 644,594

Claims priority, application Germany, Jan. 14, 1975, 7500834[U]; Mar. 21, 1975, 2512452

Int. Cl.² B65D *33/20*, *33/36*

U.S. Cl. 229—62 **5 Claims**



1. A bag of thermoplastic synthetic plastic film, particularly adapted for packaging printed material or the like, comprising:

first and second equi-width panels of thermoplastic synthetic plastic film

superimposed, with respective lateral margins aligned, to form opposite bag walls;

the second bag wall panel being continued at one end into an integrally connected short length

reflected over the edge of and onto the corresponding end margin of the first panel as a closure flap;

said closure flap being releasably bonded to the said end margin by a stripe of non-hardening adhesive whereby the flap may be lifted to open the bag and then reclosed to be again held by the adhesive;

the lateral margins of said panels being connected by welded side seams,

the lateral ends of the closure flap being including in the welded side seams and thereby secured to the bag wall panels;

the ends of the panels distal from the flap being free to afford an open mouth for bag filling, which is thereafter thermoplastically sealable; and

in the regions of its two lateral ends the said closure flap having respective lines of perforations each extending over the entire height of the closure flap.

4,015,772

CONTINUOUSLY OPERATING CENTRIFUGE DRUM FOR THE STERILIZATION OF LIQUIDS

Heinrich Hemfort, Oelde, Germany, assignor to Westfalia Separator AG, Oelde, Germany

Filed Jan. 14, 1976, Ser. No. 649,165

Claims priority, application Germany, Jan. 18, 1975, 2501924

Int. Cl.² B04B *1/14*

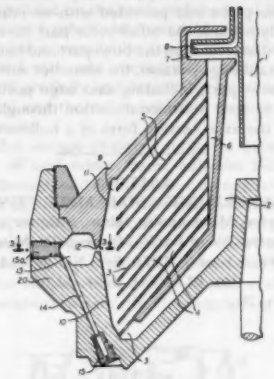
U.S. Cl. 233—20 A **9 Claims**

1. In a centrifuge suitable for purification of a liquid comprising a specifically heavier concentrate fraction and a specifically lighter liquid fraction, comprising a drum for the centrifuging which is rotably mounted, an inlet to the drum for introduction of the liquid to be centrifuged, an outlet for removal of specifically lighter liquid fraction and a separating chamber adjacent the periphery of the drum defined in part by the inner surface of the drum outer wall for formation and collection of the specifically heavier concentrate fraction, the improvement which comprises:

a concentrate chamber in the drum disposed radially outwardly of the separating chamber and about the drum axis, and which is smaller than the separating chamber,

a plurality of passageways communicating the concentrate chamber with the exterior of the drum for discharge of concentrate from the drum,

means defining a narrow annular gap communicating the separating chamber with the concentrate chamber, the annular gap being shorter in height than the height of the



concentrate chamber, so that accumulation of concentrate in the separating chamber is limited,

said gap having an inlet defined by inner surface of the drum outer wall, the gap inlet being positioned at the locus of greatest separating chamber diameter,

said inner surface of the drum outer wall being inclined for flow of concentrate from the separating chamber to said gap.

4,015,773

CENTRIFUGE FOR SEPARATING SOLIDS FROM LIQUIDS

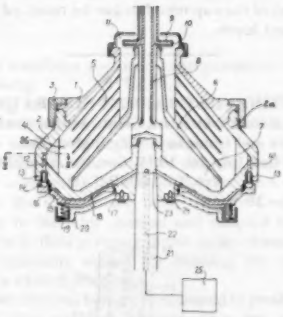
Henric Wilhelm Thylefors, Stockholm, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden

Filed Jan. 27, 1976, Ser. No. 652,754

Claims priority, application Sweden, Feb. 4, 1975, 7501189

Int. Cl.² B04B *1/14*

U.S. Cl. 233—20 A **4 Claims**



1. A centrifugal separator comprising a rotor mounted for rotation about an axis and including two axially united and interconnected parts forming between them a separating chamber, the rotor having a central inlet for a mixture of liquid and solid particles and having a central outlet for separated liquid, the rotor also having several peripheral outlets being constituted by channels extending through the rotor

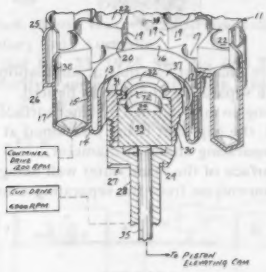
from the radially outermost part of the separating chamber to the outside of the rotor body, each said channel having a discharge opening at the outside of the rotor body, means movable axially to and from sealing contact with the outside of the rotor body to close and open said channels, said means including areas which, when in sealing contact with the outside of the rotor body, exert on opposite sides of each discharge opening a sealing force substantially parallel to the rotor axis, one of said rotor parts being constituted by a bowl formed in one piece and provided with an edge portion directed radially inward, the other rotor part having a substantially smaller diameter than the bowl part and being connected therewith at said edge portion, the chamber-surrounding portion of the bowl part, including said edge portion, having a form which, as seen in an axial section through the rotor, is substantially the axial section form of a hollow conical body.

4,015,774

DUAL CENTRIFUGE AND SAMPLE CONTAINER

Daniel G. Taylor, Minneapolis, Minn., assignor to Minneapolis War Memorial Blood Bank, Minneapolis, Minn.

Filed June 7, 1976, Ser. No. 693,649
Int. Cl.² B04B *5/04, 11/06*
U.S. Cl. 233—26 **20 Claims**



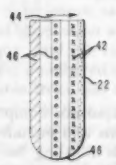
1. A centrifuge apparatus comprising a vertically-mounted centrifuge cup member, means for rotating said cup member, vertically movable bottom wall means in said cup member, means for at times moving said bottom wall means upwardly to force rotating liquid material out of said cup member, a container member surrounding said cup member, said container member having a plurality of levels containing collecting pockets, and means for positioning said container member and cup member at different relative heights such that material forced out of the cup member can be received respectively at the different levels.

4,015,775

METHOD OF GRADIENT SEPARATION

Vernon Carl Rohde, Newtown, Conn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed July 16, 1975, Ser. No. 596,234
Int. Cl.² B04B *5/02*
U.S. Cl. 233—26 **3 Claims**



1. A method using density gradient centrifugation of separating particulate matter in a sample as a function of the physical characteristics of the matter comprising the steps of:

introducing said sample into an enclosed elongated column of liquid capable of forming a density gradient or having a density gradient along the longitudinal axis of said column,

rotating said column of liquid about a spin axis other than the longitudinal axis of said column such that said longitudinal axis intersects a plane normal to said spin axis at an angle of 90°, whereby said density gradient forms or reorients transversely of said longitudinal axis,

reorienting said density gradient along said longitudinal axis, and

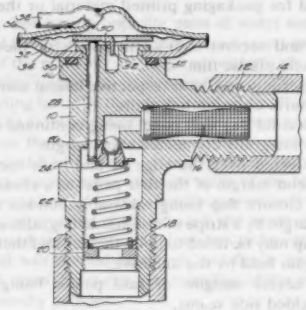
withdrawing different portions of said liquid and separated particulate matter from said reoriented density gradient along said longitudinal axis.

4,015,776

THERMOSTATIC EXPANSION VALVE

Charles D. Orth, Cedarburg, and Marcel P. Griffoul, West Allis, both of Wis., assignors to The Singer Company, New York, N.Y.

Filed Jan. 23, 1976, Ser. No. 651,717
Int. Cl.² G05D *27/00*
U.S. Cl. 236—92 B **3 Claims**



1. A thermostatic expansion valve comprising,

a valve body having an inlet and an outlet,

a valve in the body to control flow between the inlet and the outlet,

a spring biasing the valve to its seated position,

a diaphragm head assembly mounted on the upper end surface of the valve body, the assembly including upper and lower stampings and a diaphragm mounted between the stampings to define a pressure chamber in the space between the diaphragm and the upper stamping,

means interconnecting the diaphragm and the valve, the improvement comprising,

an annular integral extension from said surface received within a corresponding aperture in the lower head stamping,

an O-ring between said surface and the lower head stamping,

said extension being crimped outwardly to firmly fix the lower head stamping on the valve body with the O-ring effecting a seal.

4,015,777

THERMOSTATIC EXPANSION VALVE CAPSULE

Charles F. Treder, Brookfield, Wis., assignor to The Singer Company, New York, N.Y.

Filed Feb. 5, 1976, Ser. No. 655,491
Int. Cl.² G05D *23/02*
U.S. Cl. 236—92 B **6 Claims**

1. A thermostatic expansion valve comprising,

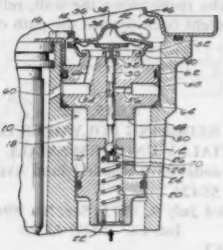
a valve body having an inlet and outlet,

a valve for regulating flow from the inlet to the outlet,

a head assembly mounted on the body and divided into two chambers by a diaphragm,

a temperature responsive charge in the head chamber remote from the body whereby the pressure in the head chamber varies with variation in temperature outside the head chamber to move the diaphragm,

a push pin engaged by the diaphragm in the diaphragm chamber opposite the head chamber and slidably mounted in a bore in the body and operatively connected to the valve to actuate the valve,



the refrigerant pressure in said diaphragm chamber being lower than the pressure at the valve end of the push pin whereby refrigerant tends to flow along the push pin in the clearance between the pin and the bore,

a flow bypass conduit means intercepting the bore and leading to a low pressure space to divert refrigerant flow from the bore away from the diaphragm chamber, said bypass conduit means being connected to the diaphragm chamber,

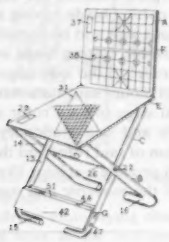
and a reduced diameter section in said pin adjacent said bypass conduit means.

4,015,778

MULTIFUNCTIONAL FOLDING CHAIR

Helen Ho-Chiu Chen, and David Wan-Ching Chen, both of B7, 640 W. 153 St., New York, N.Y. 10031

Filed Jan. 26, 1976, Ser. No. 652,340
Int. Cl.² A63F 9/00
U.S. Cl. 273—136 G **5 Claims**



1. A multifunctional, height adjustable folding chair comprising:

two generally U-shaped open frames, one outer and major and the other inner and minor, with perpendicular locking channels formed on the planar top portions thereof and horizontal slots formed adjacent the lower ends of the leg portions of said minor frame, braced one within the other by a transverse common fastener through lateral holes formed at points generally midway between the ends of the paired legs of said chair;

a flat, generally rectangular seat, which has a game board pattern printed on the top, three locking slits formed adjacent the rear end, a rectangular cutout formed on one lateral side and a storage shelf built onto the undersurface, connected pivotally and detachably at the rear end by a transverse row of bosses on its undersurface to said minor frame through said locking channels thereon, and connected detachably at the frontal end by a choice of three transverse rows of bosses on its undersurface to said major frame through said locking channels thereon, in the extended operative condition of said chair;

a flat, nearly square back panel, which has game board patterns printed on the back and the front thereof different from each other and from said pattern on said seat, and also has a rectangular cutout on one lateral side to correspond with said rectangular cutout on said seat, connected pivotally and detachably by three angle joints at the rear end thereof to said seat through said locking slits thereon;

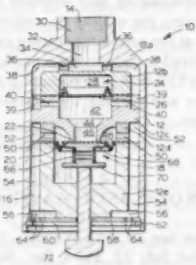
a rectangular storage chamber mounted between said leg portions of said minor frame adjacent the lower ends thereof through said slots thereon; members being dimensioned to fit one another, such that in switching from the extended position of said chair to the folded position, said back panel is folded over said seat which is then disengaged from the top of said major frame and folded over said minor frame which in turn is folded along with all other members within the boundaries of said major frame.

4,015,779

FLUID OSCILLATOR AND PULSATING SHOWER HEAD EMPLOYING SAME

Clyde C. K. Kwok, Montreal, Canada, assignor to E. V. Rippingille, Jr., Key Largo, Fla.

Filed Oct. 9, 1975, Ser. No. 621,257
Claims priority, application Canada, Sept. 19, 1975, 235925
Int. Cl.² B05B 3/14
U.S. Cl. 239—102 **10 Claims**



1. A fluid oscillator for producing pulsations in a flow of fluid comprising:

a. a housing having a fluid inlet channel for connection to a supply of fluid under pressure, and a fluid outlet channel for flow of fluid through the housing;

b. valve means located between the inlet and outlet channels for controlling fluid flow from the inlet to the outlet channel, the valve means being adapted to open by fluid pressure in the inlet channel and adapted to close by a reduction in fluid pressure in the outlet channel, the valve means including means for biassing the valve means toward a closed position;

c. the outlet channel being dimensioned to produce a reduction in fluid pressure therein after the valve means reached a fully open position, so that the valve means commences to close;

d. a pressure accumulator located adjacent to the inlet channel to attenuate fluctuations in fluid pressure in the inlet channel; and

e. an elastic separator element located in the housing to define a sealed gaseous compartment in the pressure

accumulator, so that pressure fluctuations in the inlet channel are generally absorbed by compression and expansion of the gas in the accumulator.

4,015,780

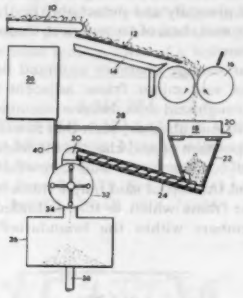
POWDER FORMING

Robert Gilmore Hall, Cambridge, England, assignor to BOC Limited, London, England

Filed May 5, 1975, Ser. No. 574,640

Int. Cl.² B02C *23/06*

U.S. Cl. 241—23 **3 Claims**



1. A process for producing powdered metal which comprises taking metal swarf, substantially removing oil from the swarf, reducing the metal swarf to a particle size of about 6 mm diameter, then substantially removing residual oil and grease from the said particles, cooling the said particles of swarf to a temperature in the range of about minus 20° C to minus 100° C to considerably reduce the impact strength of the swarf particles, and introducing the so cooled swarf particles into a comminuting mill wherein coolant is introduced into the mill during the milling operation so as to maintain the swarf particles at the said temperature range during comminution to a powdered metal having a particle size in the range of about −40 to +350 BSS for producing metal powder suitable for compaction and forging by conventional powder metallurgy techniques.

4,015,781

CONVERSION OF PLASTIC WASTE INTO EXTRUDABLE PELLETS

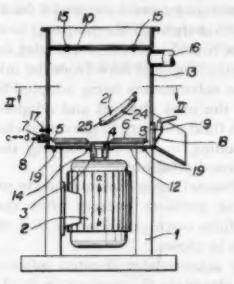
Erich Beck, Am See 29, 652 Worms - Weinsheim, Germany

Filed July 22, 1974, Ser. No. 490,873

Claims priority, application Germany, July 4, 1974, 2432495; July 4, 1974, 2432494

Int. Cl.² B02C *23/36*

U.S. Cl. 241—46.11 **12 Claims**



1. In an apparatus for the conversion of plastic waste into usable material, means including an upright wall forming a cylindrical working space, at least one rotatable knife arranged at the bottom of said space coaxial therewith, and counter action tools arranged along the wall at the bottom of said space, facing said knife, means above said knife at the top of said space for charging said space with plastic waste; and elongated means attached to said wall at a predetermined height substantially above, and separated from said counter action tools, and projecting from said wall at a distance small against the radius of said wall; said elongated means extending at said height circumferentially and in the direction of its elongation, at least along a portion of the periphery of said wall; and while said waste is being cut and circulated by said knife and thereby rising along the wall, reflecting said rising waste at said height back toward the path of said knife.

4,015,782

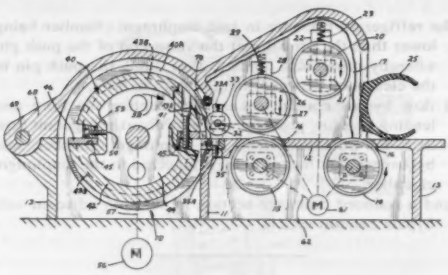
DEVICE FOR REDUCING POLYMERS OR THE LIKE TO SUBSTANTIALLY UNIFORM SMALL SIZE PIECES

Bernard H. Granite, 3519 Rhode Island Ave. South, St. Louis Park, Minn. 55426

Filed July 9, 1975, Ser. No. 594,455

Int. Cl.² B02C *13/26*

U.S. Cl. 241—62 **15 Claims**



1. A device for chopping elastomeric materials comprising a support frame, a rotor including at least one movable cutting blade extending in direction axially along the rotor, said movable cutting blade having a plurality of teeth formed adjacent one edge thereof extending toward the periphery of the rotor, said teeth being defined by outer end edges and spaced side edges generally perpendicular to the axis of rotation of said rotor, a stationary cutting blade having a cutting edge having teeth adapted to mate with and be complimentary to the teeth formed on said movable cutting blade including side stationary teeth edges parallel to the side edges of the teeth on the rotor, and means to mount said stationary cutting blade adjacent the peripheral edge of said rotor so that said movable cutting blade teeth and said stationary cutting blade teeth interfit upon rotation of said rotor and the adjacent side edges of interfitting teeth provide a scissor like cutting action along the mating sides of the movable and stationary teeth.

4,015,783

REVERSIBLE GRATE BAR AND SUPPORT FOR CRUSHERS

Donald G. Miller, Glendale, Mo., assignor to American Pulverizer Company, St. Louis, Mo.

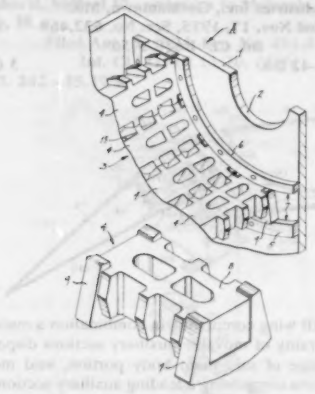
Filed July 10, 1975, Ser. No. 594,777

Int. Cl.² B02C *23/10*

U.S. Cl. 241—73 **14 Claims**

1. In a reversible grate bar for a crusher of the type having side supports for holding the grate bar surface in place during crusher usage, each bar having a width approximating the distance between the sides of the crusher, a pair of removable shoes provided for embracing each end of the bar and adapted

for securely confining the bar upon the said side supports of the crusher, and said grate bar being reversible and supportive



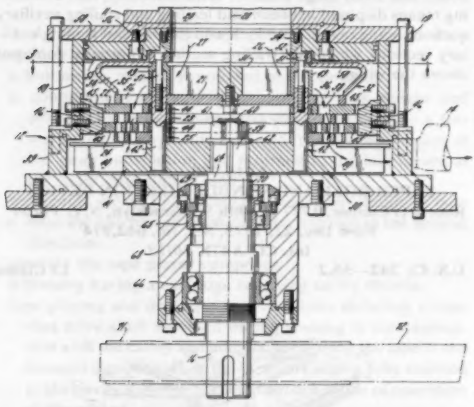
within said shoes for thereby disposing either side of the grate bar in the formation of crusher surface.

4,015,784

EMULSIFIER FOR SAUSAGE BATTER AND THE LIKE

Alvin W. Hughes, 4N 194 Church St., Bensenville, Ill. 60106

Filed Feb. 5, 1976, Ser. No. 655,626
Int. Cl.² B02C 19/12
U.S. Cl. 241—162 4 Claims



1. An apparatus for emulsifying sausage batter or the like comprising in combination:

an enclosed cylindrical emulsifying chamber, said chamber having an axial inlet at the top thereof, said chamber further having a discharge conduit, said discharge conduit being arranged perpendicular to the axis of said chamber at the bottom and tangential to the periphery thereof,

a rotatable drive shaft means arranged coaxial with and passing through the bottom of said emulsified chamber;

a plurality of spaced alternating rotatable and non-rotatable perforate rings, the uppermost and lowermost of said rings being rotatable, said rotatable rings being driven by said drive shaft means;

means within said chamber disposed above and rotatable with the uppermost of said rings to impart rotational movement to and impel said sausage batter from said axial inlet outward and vertically downward into the openings of said uppermost rotating ring; and

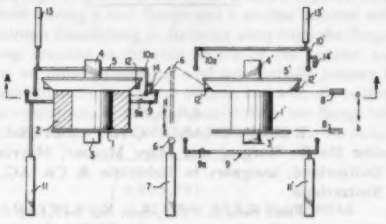
means within said chamber disposed beneath and rotatable with the lowermost of said rings to receive the sausage batter directly as it exits vertically downward from said rotating lowermost ring and to maintain the rotational movement of said sausage batter as said means directs the sausage batter into said discharge conduit.

4,015,785

METHOD AND APPARATUS FOR TREATING THE TERMINAL OF A WIRE-LIKE OBJECT IN A WIRE-LIKE OBJECT TAKE-UP APPARATUS

Yoshio Ikegami, Miki; Hirohumi Kimura, and Tadashi Kohge, both of Kobe, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan

Filed Oct. 6, 1975, Ser. No. 620,017
Claims priority, application Japan, Oct. 4, 1974, 49-114863; Apr. 12, 1975, 50-44404; May 16, 1975, 50-58959
Int. Cl.² B65H 67/04
U.S. Cl. 242—25 A 15 Claims



1. A method for treating the terminal end portion of a wire-like object within a wire-like object take-up apparatus within which, when the wire-like object wound upon a full bobbin is moved toward an empty bobbin and grasped and severed so as to consecutively and alternately perform the take-up operation of the wire-like object upon empty bobbins, the terminal portion of the wire-like object upon the full bobbin being conducted and guided by cover means, comprising the steps of:

moving a main cylindrical terminal treating cover and an auxiliary cylindrical terminal treating cover toward each other along the outer periphery of the full bobbin and relative to the wire-like object being fed to the full bobbin so as to thereby provide an overlapped condition by portions of the main and auxiliary covers for initially guiding and confining said wire-like object within an accommodating spacing defined therebetween prior to the terminal portion of the wire-like object passing therebetween; and

actuating a wire-actuating rod, subsequently and independently of said treating covers, for pushing said wire-like object to a position so as to be grasped by a pawl operatively associated with said empty bobbin and be cut by a cutter operatively associated with said full bobbin and for thereby causing said terminal portion of the wire-like object to enter said accomodating spacing defined between the main and auxiliary covers relatively disposed at said overlapped condition, and through an overlapped portion between the main and auxiliary covers, so as the thereby be accommodated and retained within said spacing as a result of centrifugal forces acting thereon during rotation of said full bobbin.

3. An apparatus for treating the terminal portion of a wire-like object within a wire-like object take-up apparatus within which the wire-like object is moved from a full bobbin to an empty bobbin disposed parallel thereto for thereby performing a continuous take-up operation, comprising in combination:

an auxiliary cylindrical terminal treating cover disposed

upon a pawl wheel side of said bobbin and which is movable along the axis of rotation of the bobbin, said auxiliary cylindrical terminal treating cover being larger in diameter than the outer periphery of said bobbin;

a main cylindrical terminal treating cover disposed opposite said auxiliary terminal treating cover and movable along the axis of rotation of said bobbin so as to form a terminal accommodating spacing around the outer periphery of said bobbin between said auxiliary terminal treating cover and said main terminal treating cover;

first actuating means for actuating said auxiliary terminal treating cover;

second actuating means for actuating said main terminal treating cover;

a wire-actuating rod for pushing said wire-like object to a position so as to be grasped by a pawl provided upon the periphery of said bobbin; and

third actuating means for actuating said wire-pushing rod.

4,015,786

BOBBIN CHANGING APPARATUS

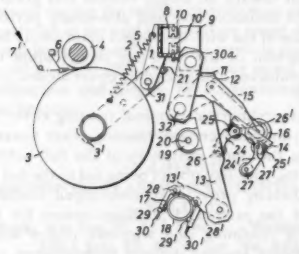
Valter Slavik, Horgen, and Marc Meisser, Meyrin, both of Switzerland, assignors to Heberlein & Co. AG, Wattwil, Switzerland

Filed Feb. 5, 1975, Ser. No. 547,168

Claims priority, application Switzerland, Feb. 6, 1974, 1610/74

Int. Cl.² B65H *67/04, 54/26*

U.S. Cl. 242—35.5 A **7 Claims**



1. In a device for bobbin-exchanging on a textile machine having a line of bobbin holders for holding bobbins to which filaments are fed continuously, the device being mounted to move along the line of bobbin holders and comprising a support, a first arm, pivotal connecting means between said support and said first arm for said first arm to swivel towards and away from a selected bobbin holder in the line thereof, a first holding device mounted on said first arm for receiving a full bobbin from the bobbin holder and withdrawing the full bobbin therefrom, a second arm, pivotal connecting means between said first and second arms for said second arm to swivel towards and away from said first arm, a power driven friction roller mounted on said second arm for frictionally rotating the full bobbin when being withdrawn from the bobbin holder, a third arm, pivotal connecting means between said support and said third arm for said third arm to swivel towards and away from the bobbin holder, a second holding device mounted on said third arm for the guided transport of an empty bobbin to said bobbin holder, and means connected to said support for controlling the opening and closing of the bobbin holder to enable the bobbin therein to be exchanged.

4,015,787

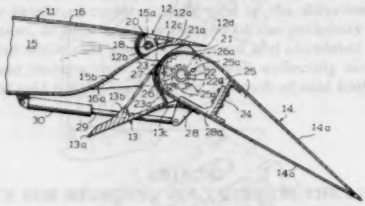
AIRCRAFT WING

Joseph R. Maieli, Central Islip; Gordon Rosenthal, Jericho, and Domenick T. Torrillo, Dix Hills, all of N.Y., assignors to Fairchild Industries Inc., Germantown, Md.

Filed Nov. 17, 1975, Ser. No. 632,468

Int. Cl.² B64C *3/50*

U.S. Cl. 244—42 DA **3 Claims**



1. An aircraft wing comprising in combination a main body portion, a plurality of movable auxiliary sections disposed at the trailing edge of said main body portion, said movable auxiliary sections comprising a leading auxiliary section and a trailing auxiliary section, hinge means operably connecting said auxiliary sections and said main body portion, said hinge means including a fixed hinge member disposed on said main body portion and connecting said leading and trailing auxiliary sections to the main body portion, said leading and trailing auxiliary sections being movable about said fixed hinge member relative to said main body portion and one another and connecting means disposed within said auxiliary sections for connecting said auxiliary sections and for causing said leading auxiliary section and said trailing auxiliary section to move about said fixed hinge member simultaneously, said connecting means disposed between said leading and trailing auxiliary sections being operable to lock said leading and trailing auxiliary sections when said trailing section is partially deployed above the wing.

4,015,788

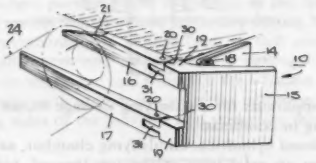
PAPER ROLL AND SPINDLE EJECTION DEVICE

Robert O'Connor, 1777 E. 48th St., Brooklyn, N.Y. 11204

Filed Dec. 22, 1975, Ser. No. 642,974

Int. Cl.² A47K *10/18*

U.S. Cl. 242—55.2 **13 Claims**



11. In combination,

a wall mounting;

a longitudinally compressible spindle rotatably mounted in said mounting;

a paper roll having a core mounted on said spindle;

an ejection device for ejecting said spindle and core from said mounting after emptying of said paper roll, said device including a mounting plate, a tab pivotally mounted on said plate, and a pair of fingers mounted on said tab and extending between said spindle and said mounting to compress said spindle upon pivoting of said tab towards said mounting plate; and

means securing said mounting plate to said mounting.

4,015,789
REVERSIBLE CARTRIDGE TAPE PLAYER SYSTEM WITH SIDE DRIVE

Melvin A. Lace, Prospect Heights, and Fernand F. Pelletier, Elmhurst, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 5, 1974, Ser. No. 491,431
Int. Cl.² G11B *15/20*, *15/44*
U.S. Cl. 242—55.19 R 50 Claims

1. A reversible cartridge tape player for a continuous loop cartridge having

a hub means rotatably mounted in the cartridge,

a continuous loop tape wound on the hub means and adapted for being driven through the cartridge in a forward direction by being removed from the hub means at the inner convolution and returned to the hub means at the outer convolution, and

tape guide means for guiding the inner convolution of tape onto the hub means when the tape is driven in the reverse direction

wherein the tape player comprises:

a housing having a cartridge receiving cavity therein,

tape playing and driving instrumentalities including a capstan drive shaft mounted on the housing in communication with the cavity and adapted for driving the tape in the forward direction when the tape cartridge is fully inserted in the cavity during a normal playback mode of operation of the player,

drive means mounted in the housing for driving the tape in a reverse direction through the cartridge during a rewind mode of operation of the player,

means mounted in the housing for coupling the drive means to a peripheral surface portion of the cartridge hub means at a point radially displaced from the axis of rotation of the cartridge hub means,

means mounted in the housing for engaging the drive means with the coupling means to drive the hub means in the reverse direction, and

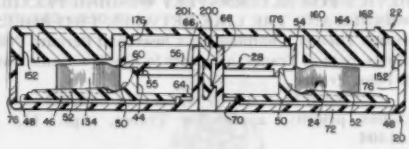
means for disengaging the capstan tape drive during the rewind mode of operation by moving the cartridge outwardly slightly in the cartridge receiving cavity,

whereby during the rewind mode of operation of the player the tape is driven through the cartridge by being removed from the hub means at the outer convolution and returned to the hub means at the inner convolution.

4,015,790
TAPE CARTRIDGE

Anthony L. Gelardi, Cranston, R.I., and Gregory Mathus, Cambridge, Mass., assignors to The Morningstar Corporation of Cambridge, Cambridge, Mass.

Continuation of Ser. No. 607,295, Jan. 4, 1967, abandoned.
This application Aug. 5, 1975, Ser. No. 602,076
Int. Cl.² G11B *23/10*
U.S. Cl. 242—55.19 A 27 Claims



1. A magnetic tape cartridge for endless tape comprising a cover and a base,

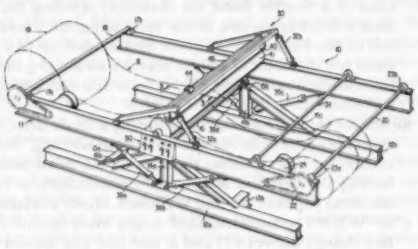
and a reel mounted for rotation on the base for carrying the endless tape in a wound condition with an exposed loop, said reel having a reel flange and a central column with the column diminishing in diameter away from the flange,

and a cap secured to the reel on top of the column and having an outer cylindrical wall substantially greater in diameter than the top of the column and with the bottom of the cylindrical wall being spaced from the flange less than the width of the tape to be packaged in the cartridge.

4,015,791
APPARATUS FOR SLITTING BELT MATERIAL

John G. Price, Box 3197, Montgomery, Ala. 36109

Filed Feb. 6, 1976, Ser. No. 655,998
Int. Cl.² B65H *35/02*, *19/30*
U.S. Cl. 242—56.2 7 Claims



1. An apparatus for longitudinally slitting rolled sheet material comprising:

a structural frame having first and second ends, first bracket means mounted on the first end of said frame;

a first shaft rotatably and removably mounted on said first bracket means;

second bracket means mounted on the second end of said frame;

a second shaft rotatably and removably mounted on said second bracket means;

a drinving means for reversibly driving said second shaft at a variable speed;

roller means mounted on said frame for frictionally engaging and forwarding said sheet material from said first end to said second end, said roller means including a drive roller and a driven roller;

means for raising and lowering said driven roller for placing a fixed pressure upon the sheet material passing between said roller means;

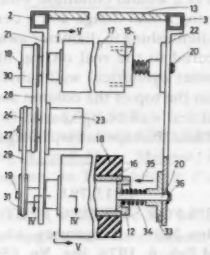
laterally adjustable knife means mounted on said means for raising and lowering said driven roller means; and

hydraulically powered means for tilting said frame about an axis parallel to said first and second shafts and intermediate between the ends of said frame so as to lower said first end to permit placing of the stock roll of the belt on said first bracket means, tilting said frame to a horizontal working position and tilting said frame so as to lower said second end for removal of slit roll material from said second bracket means.

4,015,792
DEVICE FOR ALTERNATELY WINDING FLEXIBLE BANDS AND THE LIKE BETWEEN TWO ROLLS

Christian Thenon, Chatillon-sur-Cluses, and Bernard Pelletier, Cluses, both of France, assignors to Etablissements Carpano & Pons, France

Filed Mar. 26, 1976, Ser. No. 670,713
Claims priority, application France, Apr. 11, 1975, 75.11404
Int. Cl.² B65H *17/02*
U.S. Cl. 242—67.4 **7 Claims**



1. Apparatus for reversibly winding a flexible band into a roll, comprising;

first and second reels connectable respectively to opposite ends of a flexible band for reversibly winding the band onto a winding-up one of the reels to permit providing a roll of the band wound up on the one reel up to a maximum roll diameter D and for thereby unwinding the band from an unwinding one of the reels down to a minimum roll diameter *d;* and

means for turning the reels, comprising a single drive means reversibly rotatable for the reversible winding, first and second turning elements turnable by the drive means for turning the first and second reels respectively at respective rotary speeds W1 and W2 which satisfy a relation $D/d \leq W2/W1$ to keep the band taught while the roll diameters change between D and *d*, and first and second unidirectional coupling means disposed respectively between the first turning element and the first reel and between the second turning element and the second reel, for alternately enabling the first and second turning elements to turn the respective reels for alternate winding up and unwinding of the roll on either reel.

4,015,793
FILM TAKE-UP REEL

William F. Hemminger, Seaford, N.Y., assignor to Pandick Press, Inc., New York, N.Y.

Filed Jan. 14, 1976, Ser. No. 649,061
Int. Cl.² B65H *75/28*
U.S. Cl. 242—74 **14 Claims**

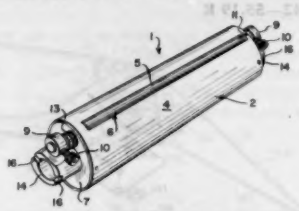
1. A film take-up reel having a hollow spool member with a longitudinal slot for receiving the film wherein said spool member defines an outer surface and an inner surface comprising:

a. a tightening shaft member rotatably secured adjacent the hollow spool member and having an effective diameter substantially less than the effective diameter of the spool member;

b. said spool member defining a slot extending substantially the entire length of the spool member and extending through the outer surface and the inner surface;

c. said tightening shaft member being rotatably secured adjacent said slot and registering with said slot along the internal surface of said spool;

d. said tightening shaft member having a shaft slot extending



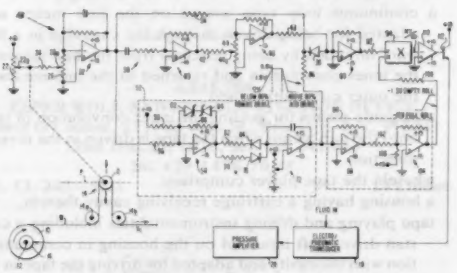
entirely therethrough and registering with said spool slot for receiving a portion of the film when in a predetermined open position; and

e. said shaft slot cooperating with said spool slot for imparting convolutions to the film by rotation of said shaft to a predetermined closed position to secure the film to the spool the open and closed positions being maintainable in the absence of a portion of film.

4,015,794
WEB TENSION CONTROL SYSTEM

Edward F. Meihofer, Norfolk, Mass., assignor to Butler Automatic, Inc., Canton, Mass.

Filed Sept. 15, 1975, Ser. No. 613,312
Int. Cl.² B65H *25/22*
U.S. Cl. 242—75.44 **12 Claims**



1. In a web-tension control system of the type having a web roll support, a brake for braking the web roll, a festoon downstream from the web roll including a dancer around which web from the roll is trained on its way to a web consuming machine and means for controlling the brake in response to dancer position so as to maintain substantially constant tension in the web, the improvement comprising

A. means for establishing a selected dancer reference position,

B. means for producing a position signal indicative of the actual dancer position,

C. means for comparing the average position of the dancer to the selected reference position to develop a relatively slowly changing second electrical signal representing the average braking torque required to maintain the dancer at said reference position,

D. means for summing said position and second signals to produce a control signal, and

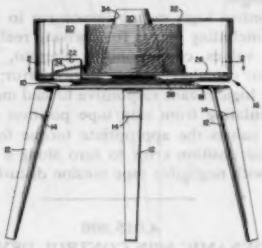
E. means for applying the control signal to control said brake.

4,015,795

CABLE DISPENSER

Robert S. Y. Chong, Aiea, Hawaii, assignor to Merry Whirler Manufacturing Corporation, Aiea, Hawaii

Filed Oct. 28, 1975, Ser. No. 625,891
Int. Cl.² B65H 49/00, 75/30
U.S. Cl. 242—85 9 Claims



1. A cable dispenser comprising a relatively stationary base, a cable dispensing control member having a bottom and an upstanding substantially cylindrical side wall, means mounting said member on said base for free rotation about the axis of said side wall, a turntable for supporting a coil of cable disposed within said member, means mounting said turntable on the bottom of said member for free rotation about said axis independently of rotation of said member, and means providing a dispensing opening at said wall through which the cable may be withdrawn from the dispenser, whereby when cable is pulled out through said opening said member is automatically oriented to align said opening with the cable payout direction while said turntable is free to relatively rotate as the cable is pulled out of the dispenser.

4,015,796

VEHICLE SENSITIVE INERTIAL SENSOR FOR RETRACTORS AND THE LIKE

Wallace Carson Higbee, Romeo, Mich., assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed June 7, 1974, Ser. No. 477,296
Int. Cl.² B65H 75/48
U.S. Cl. 242—107.4 A 4 Claims

2. A pendulum for sensing omnidirectional inertial imbalance inertially actuated safety equipment such as seat belt retractors comprising:

a frame structure;

a flat topped post upstanding in said frame structure in a normal vertical direction;

a bell shaped housing having an exterior flat top and having an internal flat surface parallel to said flat top of said bell shaped mass on said upstanding post; and

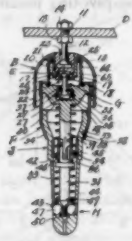
an actuating lever having a portion extending over said flat topped exterior portion of said bell housing and displaceably movable by engagement with said flat topped exterior portion of said bell housing on inertial displacement of said bell housing in any direction relative to said post.

4,015,797

BOBBIN HANGER

Zenzaburo Tsukumo, Nishinomiya, Japan, assignor to NTN Toyo Bearing Company Ltd., Osaka, Japan

Filed Nov. 6, 1975, Ser. No. 629,583
Claims priority, application Japan, Nov. 9, 1974, 49-129299
Int. Cl.² B65H 49/00, 49/02; D03J 5/08
U.S. Cl. 242—130.2 5 Claims



1. A bobbin hanger for mounting on a hanger rail comprising an elongated main body member having a top centrally disposed cavity area and a bottom disposed cavity area at the respective ends thereof, attaching means fixedly secured to and within the top cavity area of said body member and constituting the means for attaching the bobbin hanger to a hanger rail, the bottom cavity area having a spherical surface at its lower end thereof, an intermediate member having an elongated bar-like central body portion, an enlarged top head portion, and an enlarged bottom head portion at each end of the body portion respectively, said top head portion being seated in said bottom cavity area of said main body member and being semi-circular in configuration with the bottom surface thereof being spherical and corresponding to the spherical surface of said bottom cavity area, and a bottom member having an enlarged upper portion with a recess area of a dimension greater than the diameter of said main body member for receiving the bottom end of said main body therein and an internal cavity area extending centrally downwardly from said recess area, the bottom of said internal cavity area being enlarged to receive the enlarged bottom head portion of said intermediate member therein to connect said bottom member to said intermediate member, said bottom member further having a bottom tubular portion having a diameter sufficient to permit same to pass through the central aperture of a bobbin, said bottom portion also including means adjacent its lower end to releasably engage a bobbin when the portion is inserted in the central aperture of a bobbin.

4,015,798

FLEET ANGLE SYSTEM AND METHOD OF LEVEL WINDING

John S. Benya, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 17, 1976, Ser. No. 658,639
Int. Cl.² B65H 54/28
U.S. Cl. 242—157.1 5 Claims

1. An apparatus for level winding several layers of a cable on a winch drum which avoids the creation of undue stresses thereon comprising:

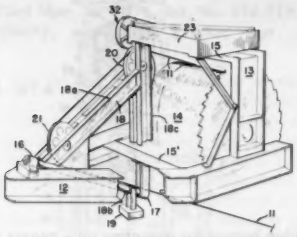
means for supporting the winch drum to permit the winding and unwinding of the cable thereon;

means mounted on the supporting means for pivoting about an axis and having an extension disposed to be pivoted about the pivot axis across the width of the drum;

means carried on the supporting means for moving the extension of the pivoting means across the width of the winch drum;

means connected to the extension of the pivoting means and the moving means for ensuring the travel of the extension across the width of the winch drum, the ensuring means includes a drive pin secured to the moving means and extending toward the extension of the pivoting means, said drive pin has its longitudinal axis coplanar with the axis of the first sheave;

means carried on the pivoting means for orientating the cable where it leaves the winch drum and where it is played out from the apparatus substantially parallel to the pivot axis of the pivoting means, the orientating means



includes a first sheave journaled on the extension of the pivoting means adjacent the winch drum and a second sheave journaled on the extension of the pivoting means adjacent the pivot axis, the first and second sheaves are positioned with repsect to each other on the extension to locate the cable in a coplanar relationship with respect to the pivot axis;

means coupled between the winch drum and the moving means for controlling the rate at which the extension of the pivoting means moves across the width of the drum; and

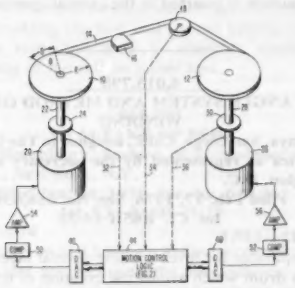
means carried on the pivoting means for counterweighting the extension of the pivoting means and the orientating means.

4,015,799

ADAPTIVE REEL-TO-REEL TAPE CONTROL SYSTEM

John Alexander Koski; Rudolf Werner Lissner, and Spencer Donald Roberts, all of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 14, 1975, Ser. No. 631,808
Int. Cl.² G03B *1/04*; G11B *15/32*
U.S. Cl. 242—203 **12 Claims**



1. A reel-to-reel tape transport apparatus

wherein an unbuffered length of tape follows a fixed-length path from a supply reel past a read/write head and guide to a take-up reel, and one motor drives the take-up reel and another motor drives the supply reel to maintain appropriate tension and tape motion at the read/write head, characterized by

a control mechanism which is continually adaptive to dynamic changes as the tape is moved from the supply reel to the take-up reel comprising:

means for measuring the variable amount of tape displaced each time one of said reels is rotated through a preselected angle;

motion control logic means responsive to said measuring means, including means for deriving reel radii and tape inertial values corresponding thereto, and including means for calculating tape position error; and

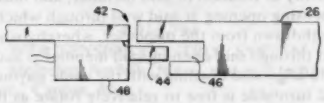
arithmetic logic means responsive to said measuring means for calculating from said tape position error and said inertial values the appropriate torque for each reel to drive said position error to zero along a predetermined profile with negligible tape tension disturbances.

4,015,800

AERODYNAMIC SPIN CONTROL DEVICE FOR AIRCRAFT

William Bihrle, Jr., 284A Tennis Court Road, Cove Neck, N.Y. 11771

Filed Apr. 22, 1975, Ser. No. 570,505
Int. Cl.² B64C *17/00*
U.S. Cl. 244—76 R **12 Claims**



1. In a high speed airplane with lifting surfaces, an aerodynamic spin control device for preventing or controlling a spin caused at least in part by the propelling side force generated by the fuselage forebody of said airplane at high angles of attack, said spin control device comprising in combination with said high speed airplane, spin control means located at the forebody area of said airplane for deploying from a housed position laterally outwardly away from the normal contour of the forebody of said airplane in response to spin conditions.

12. A method for preventing entry into or effecting recovery from a spin of a high speed airplane with lifting surfaces, caused in part by the propelling yawing moment generating by the fuselage forebody of the high speed airplane at high angles of attack, comprising varying the configuration of the forebody in response to predetermined spin conditions to change the flow field over the fuselage forebody so as to change the fuselage yawing moment from pro-spin to anti-spin.

4,015,801

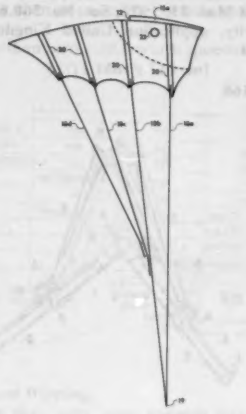
MANEUVERABLE, RAM AIR INFLATED, FLEXIBLE AERIAL WING

William H. Womble, 186 Eldridge St., Manchester, Conn. 06040, and John D. Campbell, 8764 Croydon Ave., Los Angeles, Calif. 90045

Continuation of Ser. No. 528,722, Dec. 2, 1974, abandoned.
This application Oct. 30, 1975, Ser. No. 627,118
Int. Cl.² B64D *17/14*
U.S. Cl. 244—145 **3 Claims**

1. Improvements in ram air inflated parachutes of the type comprising a canopy formed of a flexible, non-porous fabric having a leading edge and a trailing edge, and a plurality of forwardly facing transversely adjacent air cells having an upper wall and a lower wall and extending from said leading edge toward said trailing edge and terminating along a cell termination line formed by the joining of said upper and lower walls, said improvements comprising means for displacing the separation point of the relative airflow over the upper surface

of said canopy toward said trailing edge and providing more lift, said means comprising a transverse opening in the upper wall of at least some of said cells, said opening being positioned forwardly of said termination line and having the effect of moving said separation point further rearwardly toward said trailing edge.



4,015,802

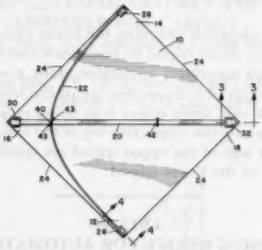
KITE CONSTRUCTION

Romeo Victor Heredia, 5648 Waring Road, San Diego, Calif. 92120

Continuation of Ser. No. 536,404, Dec. 26, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,369

Int. Cl.² B64C *31/06*

U.S. Cl. 244—153 R **10 Claims**



1. An improved kite construction comprising:

a flying surface of flexible sheet material in a four sided polygon with four corners comprising upper, lower, right and left terminal portions,

an elongated vertical rib extending between said upper and lower terminal portions,

at least one elongated cross rib extending between said left and right terminal portions,

attachment means secured to each of said corners for receiving and retaining the ends of said vertical rib and said cross rib,

said cross rib having a length that is substantially greater than the distance between said left and right terminal portions so that said cross rib is forced to assume a bowed configuration,

a bridle means secured at spaced points to said vertical rib for attaching said kite to a kite string,

said bridle is secured around said vertical rib with an end loop at each of said spaced points,

a pair of beads are strung on each of said end loops and bear against said vertical rib through said sheet material.

4,015,803

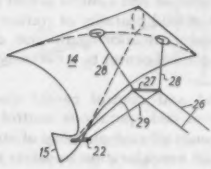
KITE WITH AN IMPROVED RUDDER

Stephen Temple, 66, Girton Road, Cambridge, England

Filed Feb. 9, 1976, Ser. No. 656,602

Int. Cl.² B64C *31/06*

U.S. Cl. 244—153 R **8 Claims**



1. A kite comprising a plane sail; a plurality of spars including a main spar having an axis and supporting said sail; a rudder, said rudder being formed on and extending outwardly of said sail and being rotatable about an axis of rotation at an acute angle to the plane of said sail, said axis of rotation being disposed in a plane which is normal to said plane of said sail and which contains said axis of said main spar supporting said sail; and a plurality of control strings for controlling movement of said rudder with respect to said sail by causing said rudder to be in operation turned into the air flow supporting said said therely to control the attitute of said sail relatively to said air flow.

4,015,804

SYSTEM FOR THE DEMAND-DEPENDENT CONTROL OF GUIDED VEHICLES

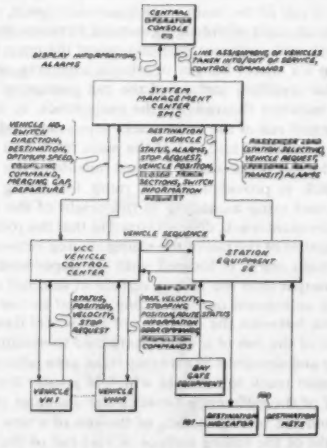
Karl Ulrich Dobler, Waiblingen; Wolfgang Jakob, Ludwigsburg; Klaus Eltzschig, Korntal, and Helmut Ubel, Stuttgart, all of Germany, assignors to International Standard Electric Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 577,148, May 13, 1975, abandoned. This application Feb. 6, 1976, Ser. No. 655,913

Claims priority, application Germany, May 15, 1974, 2423590

Int. Cl.² B61L *27/00*

U.S. Cl. 246—5 **6 Claims**



1. A system for the demand-dependent control of guided

vehicles where the equipment necessary of demand registration and control are organized hierarchically comprising:

an uppermost hierarchy level including

an operations control center, and

a plurality of station equipment each coupled to said operations control center by a two-way communication path,

said operations control center initiating commands in accordance with destination demands at each of said plurality of station equipment;

an intermediate hierarchy level including

at least one commad and control center coupled to associated ones of said plurality of station equipment by a two-way communication path and coupled to said operations control center by a two-way communication path,

said command and control center checks commands received from said operations control center and said associated ones of said plurality of station equipment giving special consideration to safety criteria; and

a last hierarchy level including

a plurality of vehicles coupled to said command and control center by a two-way communication way to perform the requested tasks in commands received from said command and control center and continuously exchanges information with said command and control center.

4,015,805

RAILWAY SWITCH OR RAILWAY CROSSING

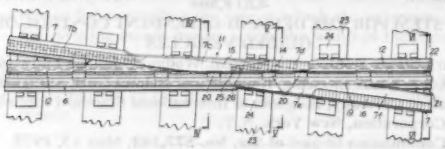
Eduard Friesenbichler, Hauptstr. 6,, A 8740 Zeltweg, Austria

Filed Jan. 2, 1976, Ser. No. 646,337

Claims priority, application Austria, Jan. 9, 1975, 114/75

Int. Cl.² E01B *7/12*

U.S. Cl. 246—458 **7 Claims**



1. A railway switch for transferring railway vehicles from a main track to a siding and, respectively, crossing of a siding with a main track, said switch or crossing comprising a frog in which one rail of the main track is uninterrupted, noting that a portion of a rail of the siding located between the rails of a main track ends adjacent said one rail of the main track leaving a gap for wheel flanges of wheels travelling on the main track, that a rolling surface of the rail portion of the siding located between the rails of the main track is, in the area adjacent said rail of the main track, super-elevated relative to a rolling surface of said rail of the main track and that a portion of the rail of the siding located outside of the rails of the main track is provided with a ramp for lifting the wheel flanges, said ramp ascending to the height of the rolling surface of the main track, characterized in that the rolling surface of the portion of the rail of the siding located between the rails of the main track is located with its uppermost area at a greater height than the rolling surface of said rail of the main track for an amount corresponding at least to one half of the difference between the diameter of the wheel flange and the diameter of the rim of a wheel subjected to maximally tolerable wear and descends like a ramp to an area adjacent said rail of the main track to a height which is greater for maximally one half of the difference between the diameter of the wheel flange and the rolling surface of the rim of a new wheel than the height of the rolling surface of said rail of the main track and is preferably approximately greater for one half of said difference.

4,015,806

TRIPOD ARRANGEMENTS

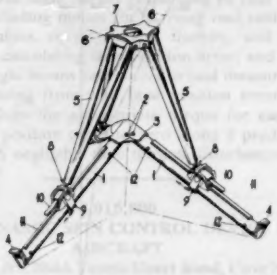
David Christopher Cattermole, Enfield, England, assignor to Elliott Brothers (London) Limited, Chelmsford, England

Filed Mar. 21, 1975, Ser. No. 560,603

Claims priority, application United Kingdom, Mar. 26, 1974, 13290/74

Int. Cl.² F16M *11/38*

U.S. Cl. 248—168 **6 Claims**



1. A tripod arrangement comprising:

I. a lower tripod including

A. three legs,

B. a center member,

C. means freely pivotally connecting said legs to said center member,

D. means on said center member to define a fully spread position for each of said three legs to which said legs are deployed in use, and

E. feet at the lower ends of said legs for resting on the ground,

II. an upper tripod including

A. a platform,

B. three legs, and

C. means freely pivotally interconnecting said three legs of the upper tripod at their upper ends to said platform, and

III. means releasably coupling the lower end of each of the legs of the upper tripod to bear upon and to be independently and separately adjustable along a substantial part of the length of a respective leg of the lower tripod,

IV. each of said three upper legs being independently adjustable along the respective leg of the lower tripod while the other legs of the upper tripod are fixed to the respective legs of the lower tripod.

4,015,807

LOGIC PASSING DEVICE FOR AUTOMATIC RAILWAY PILOTING

Guy Bourree, Paris, and Claude Pontier, Velizy, both of France, assignors to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM), Paris, France

Filed Mar. 31, 1976, Ser. No. 672,443

Claims priority, application France, Apr. 4, 1975, 75.10610

Int. Cl.² B61L *3/24*

U.S. Cl. 246—187 B **3 Claims**

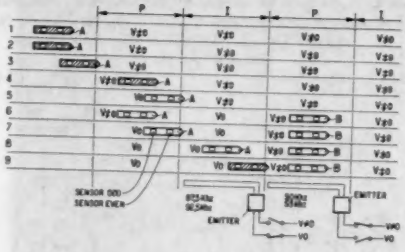
1. Automatic railway piloting method for a track divided into sections, each section comprising a closed loop circuit fed by an emitter on the ground sending out signals whose frequency is variable according to the speed limit other than zero or zero speed which the train must keep to in the said section, the engine of the train being equipped with sensors receiving the said signals and allowing the train to drive at the said speed limit or to stop, in which case, the automatic piloting is changed over to visual driving, the said sections being successively even and odd and having a code of frequencies in the even sections and another code of frequencies in the odd sections corresponding to each speed different from zero and

to zero speed, said method comprising establishing only any one of the following transition conditions to give rise to a permission to drive:

For the start-up tripping;

Speeds other than zero, even towards speeds other than zero, odd

Speeds other than zero, odd towards speeds other than zero, even



For subsequent tripping;

Speeds other than zero, even towards speeds other than zero, odd

Speeds other than zero, even towards zero speeds, odd

Speeds other than zero, odd towards speeds other than zero, even

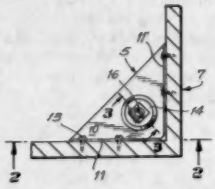
Speeds other than zero, odd towards zero speed, even.

4,015,808

COMBINED LEVELING BRACKET AND SHOCK ABSORBER FOR CABINET

John P. Carroll, Islip, N.Y., assignor to Living Walls Inc., New York, N.Y.

Filed Dec. 15, 1975, Ser. No. 641,047
Int. Cl.² B65D *19/40*; F16F *15/06*
U.S. Cl. 248—188.4 **2 Claims**



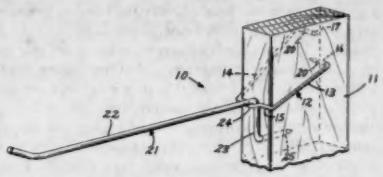
1. A device for leveling an installed cabinet and for absorbing impacts to the cabinet during transit thereof comprising a base plate, means for mounting said base plate in said cabinet, means defining a threaded bore in said base plate, a threaded stem having opposed ends, said stem being threadable through said threaded bore means, a foot mounted on one end of said threaded stem, said foot being constrained from moving along the longitudinal axis of said threaded stem, said threaded stem being threaded along the entire portion between said foot and said other end, a resilient grommet having a bore therein, said grommet being removably mounted on said threaded stem, said grommet being resiliently compressable between said foot and said base plate, and said device being substantially rigid when said grommet is removed from said threaded stem.

4,015,809

HANGER DEVICE

Robert T. Buril, 413 Wacouta St., St. Paul, Minn. 55101

Filed Apr. 24, 1975, Ser. No. 571,071
Int. Cl.² E04G *3/00*
U.S. Cl. 248—217.2 **4 Claims**



1. A hanger device for securement at an edge of a timber of known thickness, comprising a support member and a bail member;

said support member being of rod-like material and comprising a leg portion, for longitudinally engaging said edge of said timber, and a cantilever portion substantially perpendicular to said leg portion;

and said bail member being of rod-like material and comprising a pair of spaced arm portions including opposite ends, said arm portions being interconnected at first ends by a bight portion;

said arm portions extending in the same general direction from said bight portion, and being provided at second ends with securing means for fastening said bail member to the faces of said timber at locations spaced from said edge,

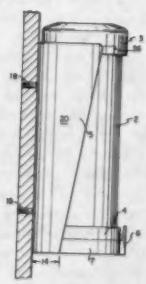
and said bight portion comprising a saddle portion between two aligned lateral portions, said saddle portion offsetting in a direction generally opposite to the general direction of said arm portions by an amount generally the same as the size of said leg portion of said support member, so that when said saddle member engages said leg portion, said linear portions can engage the surface of said edge of the timber, wherein said cantilever portion includes a pair of laterally spaced horizontal arms and a connecting portion connecting common ends of said pair of arms together, said downwardly depending leg portion being fixedly secured to said first connecting portion generally centrally between said lateraly spaced horizontal arms.

4,015,810

AUTOMATIC FLOAT-OFF STORAGE BRACKET

Wayne E. Williams, Hollywood, Fla., assignor to ACR Electronics, Inc., Hollywood, Fla.

Filed Dec. 15, 1975, Ser. No. 640,441
Int. Cl.² A47K *1/08*
U.S. Cl. 248—311.1 **15 Claims**



8. In combination, a module to be releaseably supported

having an elongated body portion, a lower portion, and an enlarged upper portion, and a mounting device for holding and releasing said module when stored in said mounting device, said mounting device comprising:

a base providing a support surface for the lower portion of said module device,

a lower retainer arrangement associated with said base and engaging said module's lower portion to prevent lateral movement of the lower portion of said module until said module is displaced upward relative to the mounting device a first predetermined distance from said base to allow unrestrained lateral passage of said lower portion from said lower retainer arrangement,

an upper retainer arrangement engaging the upper end of said module to prevent only lateral movement of upper portion of said module until said module is displaced upward relative to the mounting device a second predetermined distance no greater than said first predetermined distance,

said upper retainer arrangement having a side opening of a dimension permitting lateral passage of the body portion of said module, after said upward displacement,

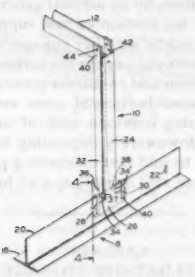
whereby after movement upward relative to said mounting device by said first predetermined distance the module may move laterally through said side opening for complete disengagement from the mounting device.

4,015,811

SUPPORT FOR A VAULTED CEILING MODULE - II

Ernest B. Nute, Jr., Mountville, and Kenneth L. Wasson, Lancaster, both of Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Dec. 29, 1975, Ser. No. 644,649
Int. Cl.² H05B *33/02*; E04B *5/52*
U.S. Cl. 248—343 **4 Claims**



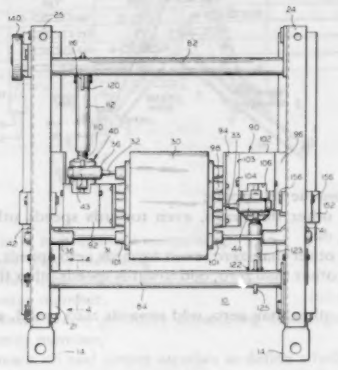
1. In a support structure for supporting ceiling elements within a suspended ceiling system, the suspended ceiling system having main runner structures which are generally of an inverted "T" shape with an upwardly extending vertical web, said support structure having a body portion and at the lower end thereof, there being a cutout which will permit a portion of the body portion to be positioned on one side of the vertical web of a main runner structure and another portion of the body portion to be positioned on the other side of the vertical web of the main runner structure, at least one side of the body portion which is positioned on one side of the main runner structure having a plate structure, said plate structure extending generally parallel with the vertical web of the main runner and said plate structure having on the ends thereof a plurality of vertical tabs, said vertical web of the main runner structure having a plurality of vertical apertures positioned therein and only one of the tabs of the plate structure of the support structure being positioned in one of the apertures of the vertical web, at least one tab engaging the vertical web side, the upper end of the body portion having means to fasten the support structure to support bars which in turn will be positioned above and parallel to the plane of the main runner structures, the improvement comprising a clip means affixed to the plate structure and engaging the vertical web of the main runner structure to positively hold the plate structure in position against the vertical web of the main runner structure.

4,015,812

SEAT ADJUSTMENT MECHANISM

Max Otto Heesch, Brooklyn, Mich., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Oct. 28, 1975, Ser. No. 626,298
Int. Cl.² A45D *19/04*
U.S. Cl. 248—394 **12 Claims**



1. A six-way power seat track for a vehicle comprising a pair of parallel rail members laterally spaced apart, a carriage tracked to said rail members and including a pair of track members with each track member individually engaging one of said rail members and constraining said carriage to movement substantially in a fore and aft sense, means interfacing between said track and rail members for causing movement of said carriage in said fore and aft sense, drive motor means, a pair of seat support brackets, for carrying respective sides of a seat, a first mechanism driven by said motor means for elevating the front end of a seat mounted on said seat support brackets, a second mechanism driven by said motor means for elevating the rear end of both of said seat support brackets, each of seat end elevating mechanisms including a torsion bar mounted on said carriage at an end thereof, each of said torsion bars being rotatable in response to selective operation of said motor means, and a link pivotally affixed to each torsion bar at one end thereof and secured at the other end to one of said seat support brackets, said links being individually responsive to rotation of the respective torsion bars for elevating the like end of both said seat support brackets to raise the respective seat end thereof.

4,015,813

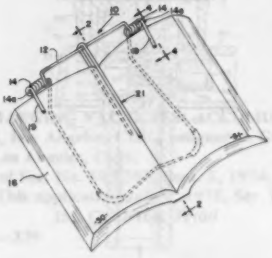
BOOKHOLDER

Thomas Andrew Graham, 796 Maplewood Ave., Palo Alto, Calif. 94303

Continuation-in-part of Ser. No. 477,622, June 10, 1974, abandoned. This application Mar. 3, 1975, Ser. No. 554,809
Int. Cl.² A47B *19/00*
U.S. Cl. 248—452 **8 Claims**

1. An improved bookholder for supporting a book and holding the pages thereof in the open condition for reading, comprising a spreader member adapted to extend along the top edge of the book when the same is in the open condition, said spreader member including at each end thereof a socket-like formation serving as portion of a hinge, a spine, a spine gripping member secured to said spreader intermediate the ends thereof and extending perpendicular thereto at one side of the spreader member, said gripping member being of bifur-

cated construction so as to define an openable slot therein for receiving the spine of the book in such slot, extension means at each end of said spreader member projecting in the same direction as said spine gripping member and serving to hold the pages of the book on each side of said gripping member in the selected open position, a stand of wire-form construction and including a foot portion having extending from the end portions thereof spaced side arms, the end portions of each side arm terminating in a pintle-like projection cooperatively



received in an associated socket member of the spreader to effect a stiff friction hinge connection between the stand and spreader, the general axis of said hinge connection being offset from the general plane of said spreader member, said pintle member being skewed at an angle with respect to the general axis of the socket-like member of the spreader, and the end portions of said side arms serving as abutments with said spreader member when said bookholder is in an extended condition.

4,015,814

FORMATION OF LUGS ON INGOT MOULDS

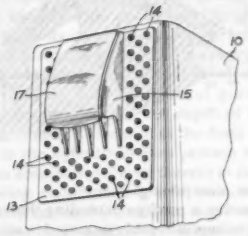
Edwin Fowles, Tarporley, England, assignor to Hilti Aktiengesellschaft, Schann, Liechtenstein

Filed Mar. 29, 1976, Ser. No. 671,107

Claims priority, application United Kingdom, May 14, 1975, 20283/75

Int. Cl.² B22D *7/06*

U.S. Cl. 249—174 **4 Claims**



1. A method of forming a lifting lug on an ingot mould which comprises the steps of:

a. securing a weldable mounting plate to said mould, in the desired location for said lug, by fasteners driven through said mounting plate and into the material of said mould;

b. welding to said mounting plate a plurality of elongate fillets each shaped to provide a substantially linear liner edge for contacting said mounting plate and a curved and lobe-shaped outer edge, in an array whose overall configuration conforms to the desired lifting lug shape, said welding being effected along said linear edges of said fillets;

c. positioning a consolidating plate across the said outer edges of said fillets; and

d. welding said consolidating plate to said outer edges of said fillets.

4. An ingot mould having a lifting lug which comprises:

a mounting plate secured to said mould by fasteners driven through said mounting plate and into the material of said mould;

a plurality of elongate fillets welded to said mounting plate and projecting therefrom in an array whose overall configuration corresponds to the overall configuration of said lifting lug, each said fillet providing a substantially linear edge by which it is welded to said mounting plate and a lobe-shaped outer edge; and

a colsolidating plate overlying said outer edges of said fillets and welded thereto.

4,015,815

CONTAMINATION-RESISTANT VALVE FOR HIGH-TEMPERATURE, HIGH-PRESSURE APPLICATIONS

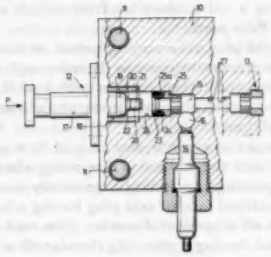
Ernst Leisner, Gerlingen; Wolfgang Ulbricht, Tamm, and Helmut Kaufmann, Bischberg, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed May 19, 1975, Ser. No. 579,118

Claims priority, application Germany, May 17, 1974, 2424148

Int. Cl.² F16K *1/44*

U.S. Cl. 251—191 **14 Claims**



1. Contamination-resistant valve particularly for especially high-temperature, high-pressure and shock applications comprising

a housing (**10**) formed with a bore (**26**) therein in communication (**27**) with a combustion chamber (**16, 29**) and with a gas inlet duct (**28**) terminating in the bore to supply a combustible gas to the bore and hence to the chamber;

a valve plunger (**17**) slidable in the bore to selectively permit gas from the gas duct (**28**) to enter the bore (**26**) and hence communicate with the chamber, or to seal the gas duct from the chamber and prevent entry of combustion gases from the chamber to the duct,

an insert sleeve (**25a, 31**) located in the bore (**26**) and having at least a portion thereof and facing the plunger of lesser diameter than the bore (**26**);

a plastically deformable material (**24, 24*a*, 24*b*) located between the wall of the bore (**26**) and said respective portion of the insert sleeve (**25*a*, 31**) and extending towards the plunger (**17**) and having an engagement surface engageable by the plunger;

a counter engagement surface (**20, 22, 35**) formed on the plunger engaging the sealing material;

and a projection (**21, 35**) extending from the end of the plunger (**17**) facing the plastically deformable material and hence the sleeve and fitting into the insert sleeve (**25*a*, 31**) so that when the plunger and its counter engagement surface are pressed against the deformable material, a tight closing fit between the plunger projection (**21, 35**) and the sleeve will form by compression of the plastically deformable material and transfer of force in radial direction from the sealing material to the insert sleeve and hence against said projection (**21, 35**) extend-

ing from the plunger (17) to seal the sleeve (25*a*, 31) against said projection.

4,015,816

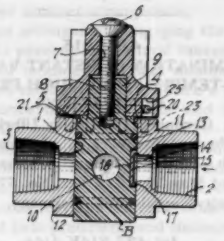
ROTARY PLUG VALVE

Albert L. Semon, 11 Eliot Place, Short Hills, N.J. 07078

Filed Apr. 24, 1975, Ser. No. 571,085

Int. Cl.² F16K *51/00*

U.S. Cl. 251—285 **14 Claims**



1. A rotary plug valve comprising:

a valve body having a cylindrical opening therethrough providing a valve chamber from which extend radially aligned flow ports;

a cylindrical plug rotatably disposed in said opening and having a transverse passage therethrough movable selectively into and out of register with said flow ports upon rotation of said plug into open and closed positions respectively, and

sealing means to encircle one of said flow ports in sealing contact with the wall of said opening when the plug is in closed position, including a generally circular recess in the cylindrical face of said plug having a bottom wall and a side wall of greater diameter than said one flow port, and a disk having a generally circular rib at its edge which has inherent resiliency seated in said recess with the rear side of said disk and its edge in sealing contact with the bottom wall and side wall of said recess respectively and with the front side of said rib to encircle said one flow port in sealing contact with the wall of said opening in valve body;

and further comprising:

a knob mounted on the end of said plug outwardly of the valve body and having circular groove in its bottom side, and wherein said body has a circular row of spaced recesses concentric with and beneath said knob, there is an arcuate wire stop element having a finger perpendicular to the general plane of said stop element at each end thereof selectively removably insertable in said recesses, and there is a stop lug in said circular groove of the knob between and to coact with said fingers of said arcuate wire stop element, providing for stopping rotation of said plug selectively in any one of a plurality of different positions.

4,015,817

STOP MEANS FOR VALVES

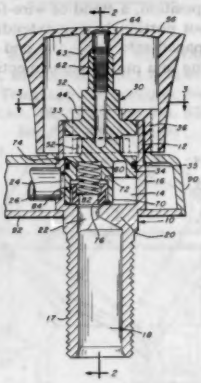
Pericles Alexandre Argyris, Houston, Tex., and William Randolph Williams, Morgantown, W. Va., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Feb. 18, 1975, Ser. No. 550,290

Int. Cl.² F16K *3/00*, *51/00*

U.S. Cl. 251—288 **10 Claims**

1. A valve assembly comprising a housing, a cylindrical chamber within said housing and inlet and outlet ports in said housing communicating with said chamber, a closure member within said chamber rotatable between a valve open and a valve closed position, a stop member mounted on said housing, stop means on said stop member defining a valve open and a valve closed position, cooperating means on said housing and said stop member to insure a predetermined orientation of said stop means with respect to said inlet and outlet



ports comprised of at least two spaced openings on said housing each of a different configuration from the other and at least two spaced portions on said stop member each of which has a configuration to match respectively the configuration of one of said openings on said housing.

4,015,818

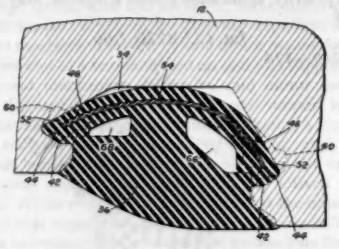
VALVE WITH SELF-RETAINING VALVE SEAT

A. Assem Tawakol, Elmira, N.Y., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed July 23, 1975, Ser. No. 598,320

Int. Cl.² F16K *1/22*

U.S. Cl. 251—307 **15 Claims**



1. A valve, comprising:

a body having a passage extending therethrough;

a closing means moveably mounted in said body and including a closing member disposed in said passage for opening and closing said passage, said body and said closing member each having opposed surfaces when the closing member is closing said passage;

a groove formed in one of said opposed surfaces, said groove being defined by surfaces that are formed and arranged to have an inner groove portion that is wider than an outer groove portion;

seal means formed of resilient material disposed in said groove for providing a seal between the opposed surfaces, said seal means including at least one axially extending arm; and

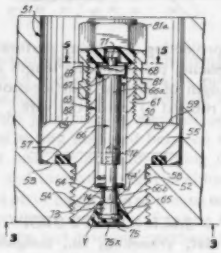
a spring member embedded in said seal means and extending into said arm for urging said arm in an axial direction away from said seal means into sealing engagement with the surfaces defining the wider inner groove portion and into an interference fit with the surfaces defining the

narrower outer groove portion for retaining the seal means within said groove, whereby installation of the seal means into the groove is facilitated by the arm and spring means which may bend as they pass the outer groove portion and thereafter return to engage the inner groove portion and provide the interference fit.

4,015,819
GAS CHARGING VALUE FOR ACCUMULATOR

Abduz Zahid, Los Angeles, Calif., assignor to Greer Hydraulics, Inc., Los Angeles, Calif.

Division of Ser. No. 503,397, Sept. 5, 1974, Pat. No. 3,930,521. This application July 1, 1975, Ser. No. 592,336
Int. Cl.² F16K *31/00*
U.S. Cl. 251—339 **1 Claim**

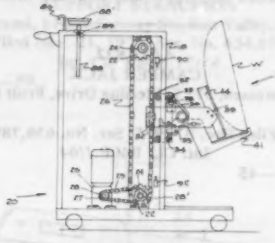


1. A valve assembly comprising a casing having an axial bore therethrough between an inlet and outlet and of reduced diameter near the outlet end defining an annular shoulder, the outermost extremity of said axial bore at the outlet end being flared outwardly to define a beveled valve seat, a valve stem slidably mounted in said bore, said stem being of dimensions such as to provide clearance for gas flow through said bore, said stem having a head portion at one end thereof extending into the beveled extremity of said casing bore, said head portion having a cylindrical stop portion with a sharp peripheral edge formed integral therewith facing said beveled seat and of diameter greater than the smaller diameter portion of said beveled seat and a length less than the depth of the beveled seat, a resilient elastomeric valve disc in the form of an annular bead secured to the cylindrical stop portion of the stem, said stem having an abutment secured thereto at the other end thereof, a coil spring encompassing said stem and reacting against said abutment and said shoulder to move the periphery of said annular valve bead against the larger diameter wall surface of said beveled seat in a first seating position of said valve disc with said peripheral edge free from contact with said beveled seat, said valve disc being shiftable substantially entirely and said head portion shiftable entirely into said valve seat in a second seating position whereat said sharp peripheral edge of said clyindrical portion of said stem engages against the smaller diameter portion of said beveled seat responsive to pressure exerted directly against said disc of a predetermined magnitude greater than said spring force, abutment of the sharp peripheral edge of said cylindrical portion of said stem against the smaller diameter portion of said beveled seat will limit the movement of the valve disc, whereby at said second seating position said disc and seat present a smooth inwardly facing surface substantially free of projections outwardly of said seat, said resilient disc completely closing off the flared end of said axial bore in both said first and second seating positions.

4,015,820
WORK LIFTING AND SUPPORTING DEVICE

Elbert W. Davis, 1090 Boiling Springs Road, Spartanburg, S.C. 29303

Filed Sept. 17, 1975, Ser. No. 614,346
Int. Cl.² B60P *1/14*
U.S. Cl. 254—4 B **20 Claims**

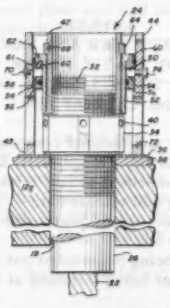


1. A device for lifting and supporting a workpiece comprising:
   a. a frame;
   b. chain drive means associated with said frame;
   c. a power source associated with said chain drive means to provide vertical movement thereto;
   d. a support section secured to said chain drive means; said support section having guide means pivotally connected thereto and cooperating with a portion of said frame, said support means further comprising a first horizontal member, second horizontal members associated with said first horizontal member for axial adjustment with respect thereto, and a support arm associated with each said second horizontal member, said support arms being capable of adjustment transverse to the length of said horizontal members;
   e. workpiece securing means associated with said support frame to secure a workpiece thereto; and
   f. switch means associated with said power source to actuate said power source for adjustment of said support section in a desired vertical direction.

4,015,821
CABLE TENSIONING ASSEMBLY

Henry G. Warrington, Boynton Beach, Fla., assignor to Vulcan Iron Works, Inc., Chattanooga, Tenn.

Filed Jan. 14, 1976, Ser. No. 648,888
Int. Cl.² E21B *19/00*
U.S. Cl. 254—29 A **7 Claims**



1. An apparatus for tensioning a cable having a threaded fitting on one end thereof, said apparatus comprising
   a base positioned around said fitting,
   a movable retaining element positioned on said fitting and adjacent said base,

a sleeve removably secured to said fitting and adjacent said element,

a jack member positioned over said fitting having one end abutting said base,

said jack member including piston means for tensioning said cable, and

an abutment member secured to said sleeve and adapted to abut said piston means to provide a mechanical connection between said sleeve and said sack member.

4,015,822

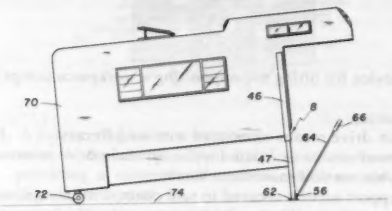
CAMPER JACK

Carl M. Rasmussen, 377 S. Sterling Drive, Fruit Heights, Utah 84037

Filed Dec. 8, 1975, Ser. No. 638,789

Int. Cl.² B60P *1/64*

U.S. Cl. 254—45 **2 Claims**



1. An extensible jack comprising:

a piston hydraulically operable in a cylinder;

a hydraulic fluid reservoir surrounding the cylinder along a substantial portion of its length;

a housing connected to the piston;

a valve block coextensive with the reservoir and at the base of the cylinder, said valve block fitting telescopically within the housing and comprising at least one hydraulic conduit therein in fluid communication between the reservoir and cylinder and having at least one check valve in the conduit, said valve block further comprising means for accessing the check valve through the exterior of the valve block, said accessing means being essentially flush with the exterior surface of the valve block so as to permit substantially all of the valve block to be recessed telescopically into the housing so as to permit the housing to slidably cover the valve block when the piston is fully retracted into the cylinder; and

hydraulic fluid pumping means for pumping fluid from the reservoir to the cylinder.

4,015,823

WIRE STRETCHER AND FASTENER

Felix B. Romberg, P.O. Box 218, Holland, Tex. 76534

Filed Dec. 22, 1975, Ser. No. 643,000

Int. Cl.² B66F *1/04*

U.S. Cl. 254—72 **12 Claims**

1. A wire stretcher and fastener comprising:

a flat ratchet bar having a longitudinal axis;

a frame slidably connected to said ratchet bar for relative movement along said ratchet bar;

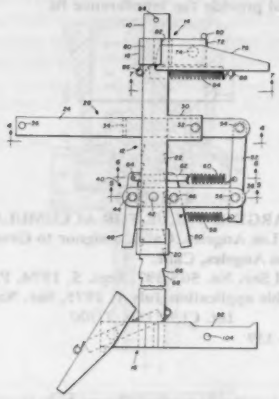
two clamps constructed and positioned to grip wire along said longitudinal axis;

one of said clamp being mounted at one end of said ratchet bar and the other being mounted at the remote end of said frame;

drive means mounted on said frame for selectively moving said frame and ratchet bar relative to each other and thereby drawing the two clamps towards each other;

the wire clamp on said ratchet bar projecting laterally from said ratchet bar;

an arm projecting laterally from said ratchet bar at the same end and in the opposite direction from said wire clamp, for engaging and winding a stretched incoming length of wire with a stretched outgoing length of wire between the end of said ratchet bar and an adjacent post; and



said laterally projecting arm being perforated for receiving a pin for spacing the incoming length of wire from the outgoing length of wire at that location when the wire stretcher is rotated to fasten the wire.

4,015,824

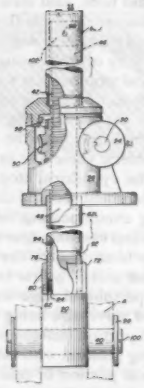
JACK SAFETY STOP

Anthony G. Profet, Wheeling, Ill., assignor to Templeton, Kenly & Company, Broadview, Ill.

Filed Apr. 5, 1976, Ser. No. 673,390

Int. Cl.² B66F *3/18*

U.S. Cl. 254—89 R **14 Claims**

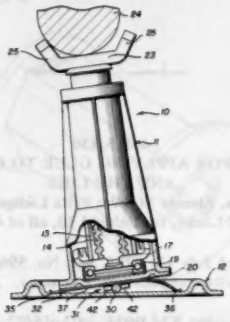


1. In a supporting jack construction the combination comprising drive means, mating driven means adapted to be reciprocally moved by said drive means along a predetermined path, stop means disposed adjacent an end limit of said predetermined path adapted to resist axial movement of said driven means by collapsing upon exertion of a predetermined collapsing force thereagainst; such collapsing force being inadequate to result in damage to said drive means and driven means at the point of the mating relation.

4,015,825
TILTABLE JACK

Richard S. Graafsma, Benton Harbor, and R. Harlan Nehrig, Stevensville, both of Mich., assignors to Auto Specialties Manufacturing Company, St. Joseph, Mich.

Filed Jan. 28, 1976, Ser. No. 653,096
Int. Cl.² B66F 13/00
U.S. Cl. 254—101 27 Claims



1. A tiltable jack comprising a jack housing member, a base member adapted to support the jack, a pivot pin disposed between the base member and the housing member and tiltably supporting the jack housing member on the base member, a bowed leaf spring disposed between the jack housing member and the base member for urging the jack housing member toward and into an upright position relative to the base member and pivot pin retaining means including a plurality of tangs depending from the leaf spring for retaining the pivot pin between the jack housing member and base member.

4,015,826
ADJUSTABLE MOUNTING ASSEMBLY FOR RAILING

René Lauzier, Ruy 38300, Bourgoin Jallieu, France

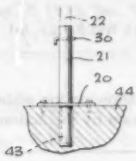
Filed Dec. 2, 1974, Ser. No. 528,893
Int. Cl.² E04B 17/14; F16C 11/06
U.S. Cl. 256—59 1 Claim

1. A railing assembly comprising:
an elongated railing; a base, said assembly comprising:
a support post secured to said railing and having a foot formed with a downwardly turned recess having a toroid-segmental surface;
a mounting block on a base for said railing and having an upwardly facing toroid-segmental surface complementary to said surface of said foot and at least partially receivable in said recess; and
screw means engageable through said foot and said block and with said base for bolting said foot to said base, said block and foot surfaces being shaped as mutually complementary surfaces of a segment of a common torus having an axis of revolution parallel to said railing, said screw means including a single screw passing through said foot and said mounting block at a location to one side of a vertical plane passing through said axis.

4,015,827
SUPPORT STANCHION

Harold E. Brand, 11039 Fenway St., Sun Valley, Calif. 91352

Filed Nov. 21, 1975, Ser. No. 634,071
Int. Cl.² E84H 17/14
U.S. Cl. 256—59 1 Claim



1. A life line support system comprising the combination of:
a plurality of stanchions wherein each stanchion consists of a stationary portion and a removable portion;
said stationary portion being fixedly attached to a roof of a building construction on the perimeter of an area to be protected;
said stationary portion having an anchor base and a tubular portion secured thereto and a gusset plate interconnecting said tubular portion and said anchor plate;
said removable portion constituting an elongated post having a selected end insertably received into said tubular portion;
fastener means detachably coupled to said tubular portion for retaining said elongated post in position thereon;
a plurality of eyelets carried on said elongated post for slidably carrying life lines therethrough;
said fastener means includes a pin insertably carried within aligned holes provided in said tubular portion and said removable portion;
index means for aligning said removable portion with said tubular portion;
an expandable plate means as a part of said tubular portion for mounting on the roof;
said plate means is composed of a pair of L-shaped members movably secured together in sliding and in releasable relationship by bolts; and
a selected one of said plate L-shaped members fixedly carrying said gusset plate and said tubular portion so as to constitute a structural unit.

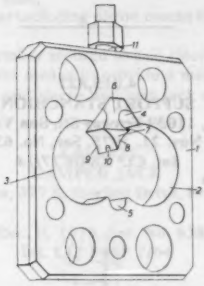
4,015,828
INJECTION OF ADDITIVES INTO LIQUID STREAMS

David Roy Miles, Pontypool, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Oct. 30, 1973, Ser. No. 411,167
Claims priority, application United Kingdom, Nov. 6, 1972, 51041/72
Int. Cl.² D01F 1/02
U.S. Cl. 259—6 5 Claims

1. A process for the incorporation of a liquid additive into a liquid stream which is being forwarded by meshing gears in a gear pump having an inlet location for the stream at a low pressure zone which is adjacent the point of gear separation and an outlet location for the combined stream and additive, said process comprising injecting said additive into said zone

at a point immediately adjacent the point in which the gears in the gear pump separate and upstream of said inlet for the



stream, and thereafter allowing the additive to be forwarded and mixed with the stream by the action of the gear pump.

4,015,829

APPARATUS FOR APPLYING GLUE TO FIBER MATERIAL

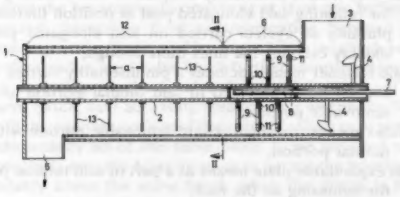
Hermann Förster, Paderborn; Wilhelm Schlüter, Schwaney, and Horst Sterr, Siebenstern, all of Germany, assignors to Wilhelm Lodige; Fritz Lodige and Josef Lucke, all of Paderborn, Germany

Continuation-in-part of Ser. No. 502,630, Sept. 3, 1974, abandoned. This application Mar. 4, 1976, Ser. No. 664,048

Claims priority, application Germany, Sept. 1, 1973, 2344231

Int. Cl.² B01F 7/04

U.S. Cl. 259—9 **9 Claims**



1. A device for applying glue to fibers of wood and like material, and for distributing the glue in the material, which includes in combination: a substantially horizontally disposed drum-shaped container having an inlet in the top at one end for admitting the material to which glue is to be applied, and having an outlet in the bottom at the other end for discharge of said material with the glue applied uniformly thereto, said drum-shaped container comprising a first axial zone adjacent to and communicating with said inlet, glue applying means in said first zone for the application of glue to fiber material supplied to the drum through said inlet, said drum-shaped container also comprising a second axial zone forming a mixing chamber in which said material and the glue applied thereto are thoroughly intermixed, said mixing chamber communicating at one end with said first axial zone and at the other end with said outlet, a shaft extending through said drum-shaped container on the axis thereof and rotatable therein, needle-shaped tools arranged in groups on said shaft in said second axial zone and extending in radial direction from said shaft to near the inner wall of said mixing chamber, said groups of needle-shaped tools being located on said shaft in axially and circumferentially spaced relationship to each other, said shaft having material impelling means thereon within the range of said inlet at the upstream end of said first zone and also upstream from said glue applying means and forming the sole means to impel material supplied to the drum via said inlet toward said outlet, said glue applying means comprising radial elements mounted on said shaft in said first zone and extending to near the inner wall of said chamber, said elements being tubular and having perforations therein, and means for supplying glue to said elements via said shaft, said material following a generally helical path along the inner wall of said container under the combined influences of said impelling means and said elements and said needle-shaped tools.

4,015,830

APPARATUS FOR APPLYING GLUE TO CHIPS, FIBERS AND THE LIKE

Wilhelm Lödige, Elsener Str. 9c; Fritz Lödige, Leuschner Str. 12, and Josef Lücke, Im Lohfeld 13, all of 4790 Paderborn, Germany

Filed July 17, 1975, Ser. No. 596,727

Claims priority, application Germany, July 17, 1975, 2434358

Int. Cl.² B01F 7/02, 15/02

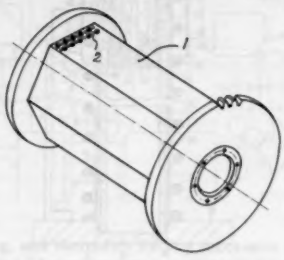
U.S. Cl. 259—25 **16 Claims**

1. An apparatus for applying glue to chips and fibers of wood, bagasse and other cellulose containing substances, which includes in combination: chamber means having a substantially cylindrical mantle, a drive shaft rotatable within said chamber means and extending in the axial direction of said mantle, said shaft having associated therewith an axially extending glue conveying passage adapted to be connected to a supply of glue, and glue applying tools connected to said drive shaft for rotation therewith and radially outwardly extending from said shaft into the vicinity of the inner surface of said mantle for plowing through a ring of chip material to be formed on said mantle and to have glue applied thereto, each of said tools having a glue conveying conduit communicating with said glue conveying passage and each tool also having a radially outer section provided with at least one glue discharge conduit having at least one glue discharge opening adapted to direct its discharge of glue in the direction toward said mantle and thereby into a ring of chip material to be formed on said mantle and to have glue applied thereto, said at least one glue discharge conduit communicating with the respective pertaining glue conveying conduit, and said at least one glue discharge conduit being provided on the trailing side of the pertaining tool when considering the direction of rotation of the latter, each glue discharge conduit forming an acute angle opening toward said drive shaft with the pertaining glue conveying conduit, said glue applying tools including a head portion in the vicinity of the ring of chip material forming a loosening-up zone therewith, said glue discharge conduit being provided with a plurality of glue discharge openings, and at least one glue discharge opening being spaced from the respective adjacent mantle surface by such a distance as to be located radially inwardly along one side of the ring of chip material to be formed on said mantle.

4,015,831
ARRANGEMENT FOR GALVANIZATION AND CHEMICAL TREATMENT OF ARTICLES

Wolfgang Petzold, Stuttgart, Germany, assignor to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Filed Sept. 20, 1974, Ser. No. 507,951
Claims priority, application Germany, Dec. 8, 1973, 2361683
Int. Cl.² B01F 9/00; C25D 17/00
U.S. Cl. 259—81 R 7 Claims

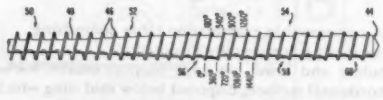


1. A drum for plating and chemical treatment of articles comprising, a drum wall with distributed openings through said wall, said openings being alternating conically shaped and arranged over the entire drum wall, the cross-section of one opening on the exterior surface of the drum wall being smaller than the cross-section of said one opening on the interior surface of the drum wall, the cross-section of a neighboring opening on the exterior surface of the drum wall being larger than the cross-section of said neighboring opening on the interior surface of the drum wall, so that said drum wall has substantially maximum perforation density.

4,015,832
EXTRUDER SCREWS

George A. Kruder, Marion, Ohio, assignor to Koehring Company, Milwaukee, Wis.

Division of Ser. No. 282,905, Aug. 23, 1972, Pat. No. 3,870,284. This application Jan. 31, 1975, Ser. No. 545,863
Int. Cl.² B29B 1/10, 1/04; B29F 3/02; B29H 1/10
U.S. Cl. 259—191 3 Claims



1. A process for extruding polymeric material in a molten state under pressure comprising:

feeding polymeric material in the form of a particulate solid to a barrel having a cylindrical inner surface and having rotating therein screw means provided with conveying land means disposed in close proximity to said cylindrical inner surface to continuously move said material in a substantially helical path toward an extrusion die without shearing said material over shearing land means disposed intermediate axially adjacent portions of said conveying land means,

converting said material to a generally molten state with no more than a minor amount of incompletely melted particles therein, and

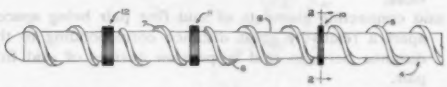
metering the flow of the generally molten material by cyclically varying, through at least three cycles, the cross sectional area between axially adjacent portions of said conveying land means of the helical path by varying the depth of the helical path from the inner wall of the barrel between a minimum depth at which the material is subjected to maximum shearing force and heat production and a maximum depth at which the material is subjected to lower shearing force and heat production,

whereby the high energy input into said polymeric material during the portions of the cycles when the depth of the path from the inner wall is in the order of said minimum depth assures complete melting of all of said incompletely melted particles, without the molten material being raised to such a temperature over said plurality of cycles as to cause it to be degraded thereby.

4,015,833
EXTRUDER SCREW

Heung Tai Kim, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Oct. 3, 1975, Ser. No. 619,510
Int. Cl.² B29B 1/12
U.S. Cl. 259—191 6 Claims

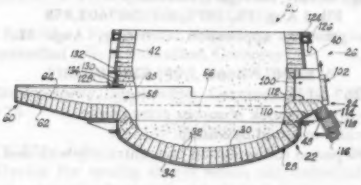


1. An extruder feed screw having a core extending longitudinally thereof, said core supporting helical flight means for advancing material from the rear portion thereof to the forward portion thereof, said feed screw having a plurality of axially spaced shear rings, each of said shear rings having a plurality of slits extending from said core outwardly to the periphery of said rings, said slits being linear and longitudinally extending, and the axial length of said shear rings being greater in the direction of the forward portion of said feed screw relative to an adjacent shear ring that is disposed rearwardly thereof considering the feed of the material processed by said feed screw is from the rear portion to the forward portion of the feed screw.

4,015,834
LIFTING BAIL FOR MODULAR DIVISIBLE METALLURGICAL FURNACE SHELLS

Edgar Wunsche, Oshawa, Canada, assignor to Engineered Metal Products Company, Inc., Birmingham, Ala.

Division of Ser. No. 519,236, Oct. 30, 1974, Pat. No. 3,952,140, which is a continuation of Ser. No. 277,142, Aug. 2, 1972, Pat. No. 3,871,632. This application Feb. 13, 1976, Ser. No. 657,959
Int. Cl.² C21C 7/00
U.S. Cl. 266—275 1 Claim



1. A lifting bail in combination with a furnace shell for use with molten metal,

comprising a generally dish-shaped bottom furnace wall section having a metal casing and a refractory lining,

a first generally ring-shaped furnace wall section removably mounted on top of said bottom section and having a metal casing and a refractory lining,

a second generally ring-shaped furnace wall section removably mounted on top of said first wall section and having a metal casing and a refractory lining,

said first wall section having a molten metal outlet opening

and a pouring spout projecting outwardly beneath said opening,

said second wall section having a slag discharge opening and a movable door for closing said opening,

and a generally horizontal lifting bail frame for separately lifting said first and second wall sections,

said lifting bail frame being non-symmetrical and having a lifting device projecting upwardly therefrom and first and second pairs of suspension devices extending downwardly therefrom,

said suspension devices of said first pair being spaced apart a substantially greater distance than said suspension devices of said second pair,

said lifting device being spaced a smaller distance from said suspension devices of said first pair than from said suspension devices of said second pair,

each of said first and second wall sections having first and second pairs of connecting elements for connection to said respective first and second pairs of suspension devices,

said connecting elements of said first pair being spaced apart a relatively great distance corresponding to the distance between said suspension devices of said first pair,

said connecting elements of said second pair being spaced apart a relatively smaller distance corresponding to the distance between said suspension devices of said second pair,

said connecting elements on said first wall section being disposed with said first pair of connecting elements relatively close to said pouring spout and with said second pair of connecting elements relatively more remote from said pouring spout whereby said first wall section will hang level from said bail,

said connecting elements on said second wall section being disposed with said first pair of connecting elements relatively close to said slag door and with said second pair of connecting elements relatively more remote therefrom whereby said second wall section will hang level from said bail.

4,015,835

SHOCK ABSORBERS FOR ELEVATORS

Günter Schumacher, Neuhausen; Peter Tef, Stuttgart, and Max Wiester, Munich, all of Germany, assignors to R. Stahl Aufzuege GmbH, Stuttgart, Germany

Filed Aug. 19, 1975, Ser. No. 605,858

Claims priority, application Germany, Aug. 21, 1974, 2440094

Int. Cl.² B66B *5/28*; **F16F** *9/48*

U.S. Cl. 267—124 **14 Claims**

1. A hydraulic shock absorber comprising:

a vertically oriented cylinder,

a hollow piston rod mounted concentrically with said cylinder,

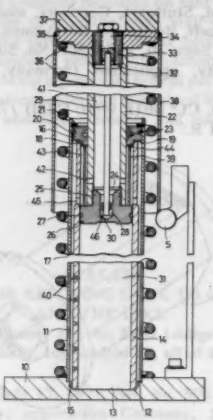
a piston connected to the lower end of said piston rod,

said piston adapted for vertical movement within said cylinder and slidably movable against the walls of said cylinder,

a cylindrical expansion chamber substantially surrounding said cylinder, said cylinder having apertures therethrough for passage of fluid from the interior of said cylinder to said cylindrical expansion chamber,

means for providing fluid communication between said cylindrical expansion chamber and the hollow interior of said piston rod,

whereby fluid from the interior of said cylinder passes into said expansion chamber and said piston rod upon the downward movement of said piston and said piston rod into said cylinder, and



wherein said piston rod contains a dip stick for measuring the fluid level.

4,015,836

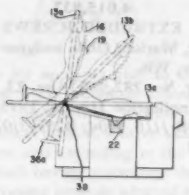
MAMMOGRAPHY TABLE

Rowland W. Redington, Schenectady, and John L. Henkes, Jr., Latham, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 600,874, July 31, 1975. This application Jan. 16, 1976, Ser. No. 649,707

Int. Cl.² A61G *13/00*

U.S. Cl. 269—322 **8 Claims**



1. A tomographic examination table comprising:

a fabric sling horizontally disposed;

shoulder and lower rib cage support means, including a horizontal surface, disposed below said sling which function to support the shoulder and lower rib cage of a female humoid patient;

rigid platform means extending from said sling which function to support the lower body of said patient; and

upper rib cage support means extending diagonally upwards from the sides of said sling.

4,015,837

METHOD AND APPARATUS FOR INSERTING SUPPLEMENTS INTO ROTARY PRESS PRODUCTS

Erwin Ostler, Augsburg, Germany, assignor to Hier. Muhleberger KG, Augsburg, Germany

Filed Apr. 2, 1976, Ser. No. 672,912

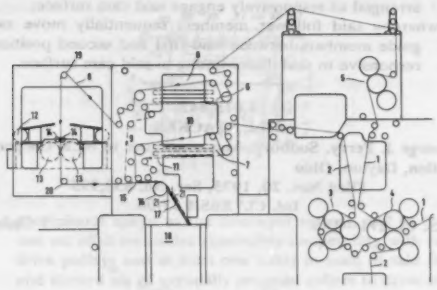
Claims priority, application Germany, Apr. 25, 1975, 2518336

Int. Cl.² B65H *39/02*

U.S. Cl. 270—58 **14 Claims**

1. The method of inserting supplements into a rotary press product wherein said product is produced by continuously running at least one elongated paper web from a supply roll through printing rolls, comprising the steps of applying an

electrostatic charge to the surface of said running web subsequent to passage of the web through said printing rolls, delivering a series of supplements sequentially and in face-to-face relation to the charged running surface of said web for electrostatic adhesion of said supplements to said web while said web



is still running, and thereafter folding successive portions of said web while said supplements are electrostatically adhered thereto to form at the conclusion of said folding step, folded rotary press products each of which has one of said supplements inserted therein.

4,015,838

APPARATUS AND METHOD OF FORWARDING SHEET FROM PAPER OR SIMILAR MATERIAL

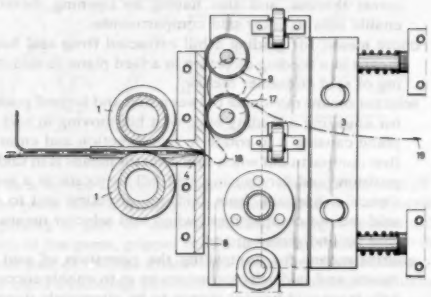
Wilhelm Thurmann, Glueck-Auf-Strasse 7, Wilnsdorf-Obersdorf, Germany

Filed Oct. 30, 1975, Ser. No. 627,308

Claims priority, application Germany, Oct. 30, 1974, 2451469

Int. Cl.² B65H *45/00*

U.S. Cl. 270—61 F **12 Claims**



1. A method of folding an elongated sheet of material such as paper or foil, comprising the steps of

a. forming a double loop of substantially S-shaped configuration as viewed along an edge thereof in a portion of said sheet intermediate the ends thereof, said double loop including a folding loop with a rounded apex and a pair of legs extending therefrom, and a blind loop of opposite curvature to said folding loop displaced longitudinally of said sheet relative to said folding loop

b. pressing together said pair of legs of said folding loop remotely from said apex of said loop progressively to said apex, to produce a fold in said sheet; and

c. maintaining the shape of said blind loop substantially unaltered during said pressing step.

4,015,839

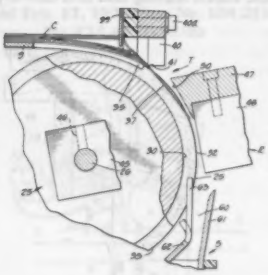
CARD FEEDING STATION

James W. McKee, Mission Viejo, Calif., assignor to True Data Corporation, Santa Ana, Calif.

Division of Ser. No. 198,722, Nov. 15, 1971, Pat. No. 3,847,382. This application Nov. 11, 1974, Ser. No. 522,735

Int. Cl.² B65H *3/06, 3/34*

U.S. Cl. 271—37 **7 Claims**



1. In card handling apparatus: a feed station adapted to receive a stack of cards, card transport means including a feed roll having a cylindrical friction surface, means for feathering said cards towards said feed roll to present the leading edge of successive cards to said feed roll, drive means for continuously rotating said feed roll, pressure applying means adjacent to said feed roll for engaging the leading edge of successive cards and pressuring said cards into frictional engagement with said surface of said feed roll, feed means operable independently of said drive means normally holding the leading edge of said cards and said pressure applying means in positions at which cards are out of frictional contact with said feed roll, and means for operating said feed means to allow said pressure applying means to press said cards successively into engagement with said feed roll, said feed roll having a peripheral groove, said feed means including a plate mounted for pivotal movement on an axis transverse to said cards, said plate having a portion extending into said groove for normally holding said cards out of frictional engagement with said feed roll, said plate being operable by said operating means to move said portion of said plate into said groove to enable frictional engagement of the card adjacent to said plate with said feed roll.

4,015,840

DEVICE FOR TESTING SHEETS DELIVERED FROM A FOLDING APPARATUS ASSOCIATED WITH ROTARY PRINTING PRESSES

Peter Schröder, Frankenthal, Germany, assignor to Albert-Frankenthal AG, Frankenthal, Germany

Filed Mar. 2, 1976, Ser. No. 663,016

Claims priority, application Germany, Mar. 27, 1975, 2513774

Int. Cl.² B65H *29/60*

U.S. Cl. 271—64 **10 Claims**

1. Device for testing sheets which are delivered from a folding apparatus associated with rotary printing presses having a first delivery belt positioned at a first level movable at a predetermined rotary speed for delivering folded sheets of printed matter, comprising:

a second delivery belt positioned adjacent to and at a second level lower than said first level for normally receiving the printed sheets and movable at the same rate of speed as said first delivery belt;

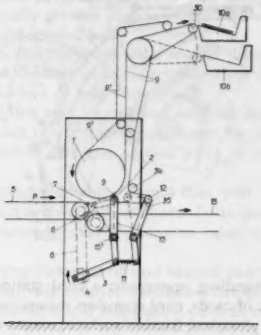
a rotatable drum;

a first guide belt coupled with and movable with said rotatable drum and movable at a speed higher than said predetermined speed;

a receiving roller;

a second guide belt coupled with and movable at the same speed as said first guide belt and movable in tangential juxtaposition therewith adapted to transport a folded sheet therebetween;

an oscillatable arm connected with and supporting said receiving roller for oscillatory movement from a first position remote from said first delivery belt to a second position adjacent to said first delivery belt to intercept one of the sheets leaving said first delivery belt onto said



second guide belt and movable to a third position to transfer said intercepted sheet to said tangential juxtaposition of said first and second guide belts, said receiving roller being moved into tangential contact with said rotatable drum when said oscillatable arm moves into the third position thereof; and

a special delivery means positioned at a delivery end of said tangentially positioned guide belts for receiving the sheet carried between said guide belts.

4,015,841

SORTER

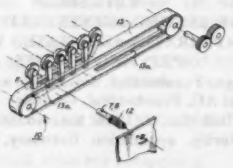
Sakae Mitsumasu, Ebina, Japan, assignor to Rank Xerox Ltd., London, England

Filed May 24, 1976, Ser. No. 689,290

Claims priority, application Japan, Sept. 11, 1975, 50-124332[U]

Int. Cl.² B65H *39/10*

U.S. Cl. 271—173 **8 Claims**



1. In a sorting apparatus for collating sheets into sets comprising:

means for conveying said sheets along a desired path;

a plurality of sheet receiving bins arranged along said path;

means for distributing said sheets from said conveying means sequentially into said sheet receiving bins, said distributing means including a plurality of movable guide members associated with said bins for removing sheets from said conveying means and guiding them into said bins, and means for moving sequentially each of said guide members between a first position wherein said guide member will remove a sheet from said conveying means and guide it into a bin associated with said guide member and a second position wherein said guide member will not remove a sheet from said conveying means;

the improvement wherein said means for moving said guide members includes:

a cam comprising a web having a cam surface with at least one discontinuity therein; and

at least one follower member connected to each of said guide members, each of said follower members being arranged to responsively engage said cam surface;

whereby said follower members sequentially move said guide members between said first and second positions responsive to said discontinuity in said cam surface.

4,015,842

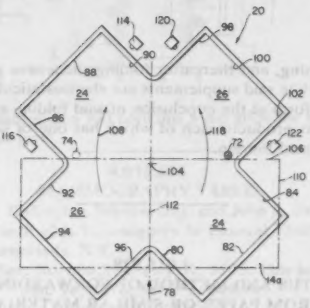
BILL STACKER

George J. Perry, Sudbury, Mass., assignor to NCR Corporation, Dayton, Ohio

Filed Nov. 20, 1975, Ser. No. 633,995

Int. Cl.² B65H *33/06*

U.S. Cl. 271—185 **7 Claims**



1. An automatic bill stacker comprising:

hopper means for storing bills;

feed means for extracting a single bill from said hopper means;

a container means being cruciform in cross section and having first and second intersecting rectangular compartments therein, and also having an opening therein to enable bills to enter said compartments;

chute means for guiding a bill extracted from said hopper means in a feeding direction in a feed plane to said opening of said container means;

selector means moveable between first and second positions for engaging a leading edge of a bill moving in said feed plane causing it to rotate in one direction and enter said first compartment when said selector means is in said first position, and for causing said bill to rotate in a second direction opposite from said one direction and to enter said second compartment when said selector means is in said second position; and

control means for controlling the operation of said feed means and said selector means so as to enable successive bills from said hopper means to be alternately deposited in said first and second compartments.

4,015,843

NEWSPAPER STREAMLINER

James R. Tennant, Rte. 3, Box 247, Haughton, La. 71037

Filed Oct. 14, 1975, Ser. No. 621,681

Int. Cl.² B65H *9/16*

U.S. Cl. 271—240 **9 Claims**

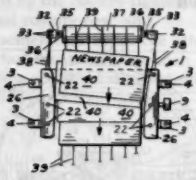
1. A newspaper streamliner for maintaining the alignment of newspapers in a newspaper conveyor system comprising:

a. a frame positioned in said conveyor system;

b. a first and second set of vertically oriented, essentially aligned rollers disposed in essentially parallel relationship on said frame on either side of the conveyor in said conveyor system;

c. a first endless belt mounted on said first set of vertically oriented rollers and a second endless belt mounted on said second set of vertically oriented rollers; and

d. a set of drive pulleys mounted in cooperation with said conveyor system and rotating at essentially the same



pheripheral speed as the conveyor system, and at least one set of drive cables removably cooperating with said drive pulleys and at least one roller in each of said first and second set of vertically oriented rollers to drive said vertically oriented rollers and said endless belts.

4,015,844

SHEET CONVEYING DEVICE FOR A PLATEN PRESS

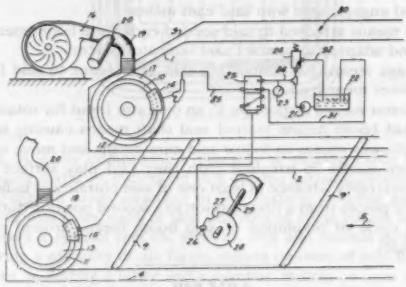
Walter Gruetter, Morrens, and Jean-Daniel Bron, Prilly, both of Switzerland, assignors to J. Bobst & Fils, S.A., Switzerland

Filed May 5, 1976, Ser. No. 683,403

Claims priority, application Switzerland, May 7, 1975, 005859/75

Int. Cl.² B65H *5/02*

U.S. Cl. 271—266 **10 Claims**



1. In a device for conveying a sheet between stations of a platen press with a dwell period at each station, said device comprising a pair of endless chains arranged within side frames of the press, gripper bars attached by their ends to the spaced pair of endless chains and extending therebetween, a drive shaft extending between the side frames and mounted for rotation, said drive shaft having a drive sprocket for each of said pair of endless chains, at least one driven sprocket for each of said pair of endless chains mounted on the side frames in spaced relation to the drive shaft, means for intermittently rotating said drive shaft including a pinion connected to the drive shaft by a one-way clutch, a sector gear mounted for oscillating movement and engaging the pinion and a connecting rod for transferring movement of an eccentric to the sector gear, the improvements comprising at least one of the driven sprockets having an axial extension, braking means supported on the side frame adjacent said one driven sprocket for engaging said extension, means including at least one blower for cooling said braking means, and means for actuating said braking means including a control shaft mounted for rotation and making one complete revolution for each cycle of oscillation of the sector gear, said control shaft having means for causing the engagement and disengagement of the braking means during a portion of each revolution thereof.

4,015,845

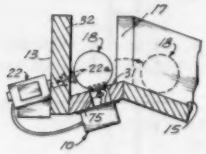
AUTOMATIC CUE BALL SEPARATING AND RETURN ASSEMBLY FOR BILLIARD TABLES

Randy D. Sines, 601 5th Ave. S., Apt. 2, Great Falls, Mont. 59405

Filed Feb. 17, 1976, Ser. No. 658,251

Int. Cl.² A63D *15/00*

U.S. Cl. 273—11 C **9 Claims**



1. An automatic cue ball separating and return assembly for billiard tables of the type having six ball receiving pockets with ball return runs leading from the pockets to a common single file run and with an object ball access opening at an end of the run and a separate cue ball return run leading from a junction with the single file return run to a separate cue ball access opening, said assembly comprising:

a cue ball having a solid smooth spherical outer shell encapsulating a metallic core member and being equal in size and weight to the object balls;

means for electrically producing an oscillating electrical field at a location along the single file run;

wherein said field is distorted by the metallic core of the cue ball but is relatively insensitive to non-metallic object balls;

detecting means for responding to disruption of the electrical field and for producing a signal in response thereto; and

kicker means adjacent the juncture of the single file run and cue ball return run operated in response to the signal to force the cue ball from the single file run onto the cue ball return run.

4,015,846

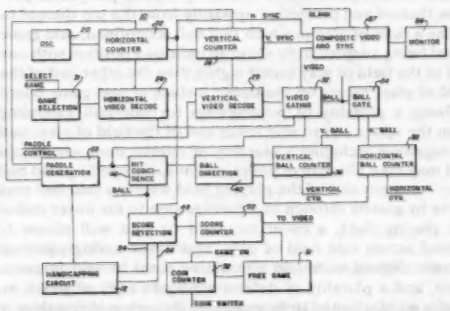
HANDICAPPING CIRCUIT FOR ELECTRONIC GAMES

Robert Ralph Runte, Palatine, and Theodore A. Mau, Chicago, both of Ill., assignors to Robert Ralph Runte, Palatine, Ill.

Filed Apr. 30, 1976, Ser. No. 681,845

Int. Cl.² A63F *9/00*

U.S. Cl. 273—85 R **19 Claims**



1. An electronic handicapping circuit for use with an elec-

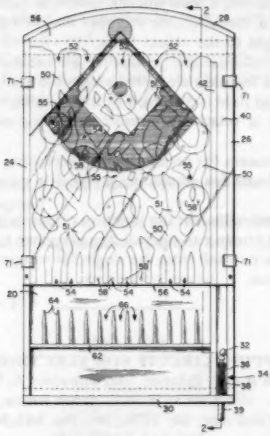
tronic visual game comprising: means for generating a movable video image; means for providing scoring event signals; means for receiving said signal of said scoring event; means for selectively storing said signal of said scoring event connected to said means for receiving said score signal; means for providing a predetermined score differential and means for providing an output indication for said predetermined score differential connected to said means for selectively storing said signal of said scoring event, said means for providing said output indication of said predetermined score differential being adapted to provide a control signal, said control signal being adapted to regulate a movable video image generated by said electronic visual game.

4,015,847

PINBALL SPORTS COMPLEX

Stephen B. Myers, 413 Crest Road, Oreland, Pa. 19075

Filed Mar. 25, 1976, Ser. No. 670,451
Int. Cl.² A63F 7/06
U.S. Cl. 273—121 R **12 Claims**



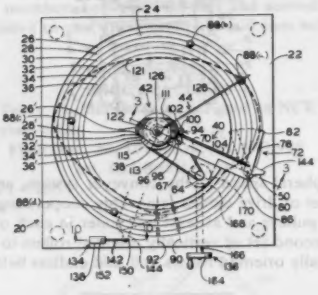
1. A game apparatus comprising: a game board, a ball, wall means on said game board extending around peripheral portions thereof and projecting upwardly from the top thereof to define a field of play in which said ball is confined, said game board being adapted to be set in an indicated position with one end of the field of play raised higher than the other end of the field of play, means on the upper surface of said game board defining a plurality of passageways for said ball extending from the upper end to said lower end of the field of play, said passageways including a plurality of intersections where said ball may take alternative paths, means for propelling said ball into the upper end of the playing field whereby said ball may move by gravity through said passageways to the lower end of the playing field, a cover mounted on said wall means to extend across said field of play, said cover having openings therein aligned with said alternative paths at said intersections, and a plurality of defensive players each of which includes a pin adapted to be extended through said openings in said cover into said alternative paths therebeneath to block the movement of said ball.

4,015,848

GAME APPARATUS

Edward M. Pauwels, 2038 Hollywood Place, South Bend, Ind. 46616

Filed Feb. 2, 1976, Ser. No. 654,618
Int. Cl.² A63F 9/14
U.S. Cl. 273—126 R **11 Claims**



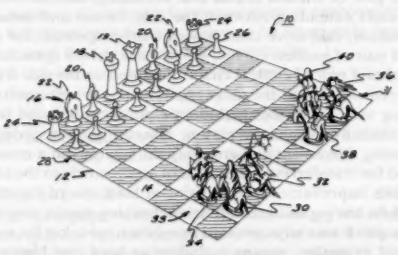
1. A game apparatus comprising:
a housing;
shaft means secured to said housing;
boom means having a first end pivotally located on said shaft means and a second end extending over a play surface, said play surface having a plurality of indicator pieces located therein;
cam means positioned on said shaft means adjacent said boom means;
follower means pivotally located on said boom means;
resilient means for biasing said follower means into continual engagement with said cam means;
arm means attached to said second end of the boom means and adapted to contact said indicator pieces;
linkage means for connecting said arm means to said follower means; and
actuator means responsive to an operator input for rotating said boom means around said shaft means causing said follower means to follow said cam means and move said arm means in irregular path over said play surface to preferably advance at least one of said plurality of indicator pieces from a first position to a second position during a cycle of revolution of said boom means around said shaft.

4,015,849

CHESS-LIKE GAME

Charles A. MacLean, 23073 Beech, Dearborn, Mich. 48124

Filed Oct. 29, 1975, Ser. No. 626,940
Int. Cl.² A63F 3/02
U.S. Cl. 273—131 KC **1 Claim**



1. A chess-like game for at least two players comprising:
a checkerboard playing area with ranks and files of bilaterally alternating colored spaces;

a first set of chess pieces comprising a subset of eight royalty figures for one of the two players initially positioned to form a royalty row along one rank at the edge of said checkered playing area;

a subset of eight pawn figures for said one player initially positioned on said playing area in the rank adjacent the rank occupied by the royalty figures to form a pawn row in front of said royalty row; and

a set of six horsemen figures for the other player, said figures of said last-mentioned set each differing from the others and being visually distinguishable from said royalty figures and said pawn figures.

4,015,850

BINGO DICE GAME

Mitchell John Russell, 814 N. Delaware, San Mateo, Calif. 94010

Filed Sept. 2, 1975, Ser. No. 609,247
Int. Cl.² A63F *3/06*
U.S. Cl. 273—135 B **8 Claims**

1. A game comprising a plurality of playing cards having playing surfaces, indicia on said playing surfaces deliniating a plurality of areas arranged in five vertical columns and five horizontal rows, each of said plurality of areas having located therein a symbol specific thereto, first and second dice each having a plurality of die faces, indicia on ones of said first die faces, including a letter and a number, indicia on ones of said second die faces including different numbers, so that the combination of said dice face indicia from one face of each die corresponds to said symbol specific to one of said plurality of areas on ones of said plurality of playing cards, and a plurality of markers each formed to lie within one of said plurality of areas, whereby successive casting of said pair of dice produces a succession of upturned dice face indicia combinations, so that when said succession of combinations is marked by placing ones of said plurality of markers to overlie corresponding symbols in ones of said plurality of areas, a pattern is created on said playing surfaces wherein the purpose is to duplicate by chance a predetermined pattern on one of said playing surfaces.

4,015,851

RUBBER GRIP FOR TENNIS RACKET HANDLES

Paul H. Pennell, North Jackson, Ohio, assignor to Elastomeric Products Inc., North Jackson, Ohio

Filed Feb. 9, 1976, Ser. No. 656,714
Int. Cl.² A63B *49/08*
U.S. Cl. 273—75 **1 Claim**

1. A rubber grip for a tennis racket handle comprising a single longitudinally stretchable wrapping strip formed of two layers of two different rubber compounds cured and joined by vulcanization, the first compound being relatively harder and stronger than the second compound which is relatively softer, more tacky and weaker than the first compound, the first compound forming a base layer of the wrapping strip when positioned around a tennis racket handle and the second compound forming the outer layer and the surface of the rubber grip on the tennis racket handle, said strip having opposite edges, longitudinally extending flanges formed on

said opposite edges of said wrapping strip in oppositely disposed relation to one another, one of said flanges having a surface coextensive the surface of the base layer and the other flange having a surface coextensive with the surface of the outer layer and surface of the rubber grip, a tab formed on and extending perpendicularly from the longitudinal flange having a surface coextensive with said base layer and arranged to be initially overlapped by said wrapping strip when the rubber grip is wrapped around a tennis racket handle so as to form a self-containing end construction.

4,015,852

MAZE-TYPE PUZZLE

Ross E. Gibson, 1168 W. Cliff Drive, Santa Cruz, Calif. 95060

Filed May 12, 1976, Ser. No. 685,767
Int. Cl.² A63F *9/08*
U.S. Cl. 273—153 R **6 Claims**

1. A puzzle comprising:

a game board having a plurality of predesignated areas on the playing surface thereof;

upstanding walls defining the perimetral boundaries of said areas;

at least one opening in the wall defining each of said areas;

a plurality of first connecting means in one of said areas adapted to have a plurality of string-like elements secured adjacent one end thereof respectively to corresponding ones of said connecting means;

a plurality of second connecting means located separately in preselected other of said designated areas adapted to be detachably connected with the other ends of the string-like elements; and

a plurality of string-like elements each adapted to be secured adjacent one end thereof to respective ones of said first connecting means and at the other end with respective ones of said second connecting means.

4,015,853

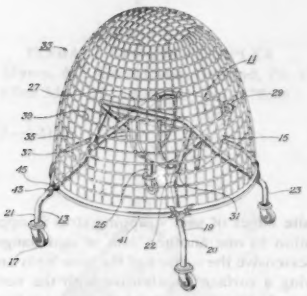
BABY WALKER ENCLOSURE

Cherry Sue Summers, 4133 Cherokee Trail, Fort Worth, Tex. 76133

Filed Aug. 25, 1975, Ser. No. 607,104

Int. Cl.² B62B 7/00

U.S. Cl. 280—87.02 W **9 Claims**



1. A device for attachment to a baby walker of the type having a frame mounted on castors and a seat for a child supported by the frame comprising:

an enclosure extending over and around the seat for enclosing the child;

means for attaching the enclosure to the frame;

a plurality of intersecting ribs spaced apart to form a plurality of apertures, the apertures being small enough such that a child may not extend his hand through; and

a lip at its bottom perimeter for carrying the attaching means.

4,015,854

FRAME FOR VARIOUS CYCLES

Louis Maurice Ramond, 28, rue de la Baume, Saint-Etienne, France

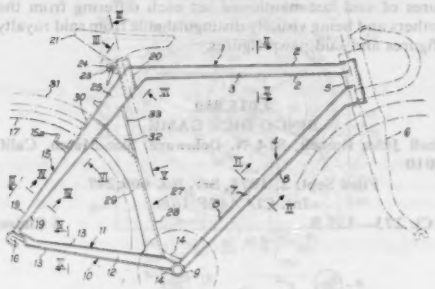
Filed Mar. 25, 1975, Ser. No. 561,834

Claims priority, application France, Mar. 29, 1974, 74.12210

Int. Cl.² B62L 3/04

U.S. Cl. 280—281 R **8 Claims**

1. A bicycle frame formed by a plurality of elements integral with each other to form a structurally continuous and homogeneous, unitary structure without inhomogeneous joints including welds, said elements including a top crossbar, a steering tube at the front end of said crossbar, a transverse crank gear case below and spaced downwardly from said crossbar, a bottom member extending from said steering tube to said crank gear case, a wheel receiving fork having two arms extending rearwardly from said crank gear case and having wheel spindle receiving openings at the rearward ends of said arms, a pair of struts extending from said arms of said fork, adjacent said openings, to the opposite, rear end of said crossbar and a rigid strut member extending from said struts at portions thereof intermediate said top crossbar and said openings to said arms of said fork adjacent said crank gear case, said crossbar, said bottom member, said two arms, said struts and said strut member each having an open cross-section which has at least one open side, said crossbar and said bottom member lying substantially in a plane, each of said crossbar, said bottom member, said two arms and said struts being disposed with said open side thereof facing away from said plane, and said strut member having a portion which extends



from adjacent said crank gear case to a portion of said struts spaced from said rear end of said crossbar, having a partition extending transversely to said plane and from intermediate the ends of said portion of said strut member to adjacent said rear end of said crossbar and having a strengthening member intermediate and joined to said partition and said last-mentioned portion whereby said strut member acts as a stiffening member between said struts, and said arms to prevent movement of the upper ends of said struts toward said crank gear case.

4,015,855

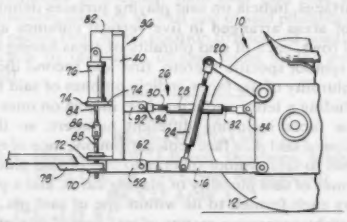
IMPLEMENT HITCH

Clarence R. Murray, P.O. Box 1227, Erick, Okla. 73645

Filed Feb. 27, 1976, Ser. No. 662,143

Int. Cl.² B60D 1/04

U.S. Cl. 280—415 A **9 Claims**



1. An implement hitch for connecting an agricultural tractor to an agricultural implement comprising:

an A-frame having a top and a bottom and including a pair of convergent side frame members interconnected by a central crossbar and having spaced lower ends;

a horizontally extending draw bar extending between and interconnecting the lower ends of the side frame members of the A-frame, and having a front side and a rear side;

link-engaging bracket pairs on the opposite ends of said draw bar and on the front side thereof, the brackets in each bracket pair defining a space for receiving therebetween the lateral lift links of an agricultural tractor;

a clevis bracket projecting from the rear side of said draw bar at the center thereof and including two vertically spaced apertured plates;

means on said central crossbar for connecting a central adjusting link of a tractor to said central crossbar;

power cylinder supporting means on said A-frame above said clevis bracket for supporting a power cylinder above said clevis bracket on said A-frame;

a piston rod extensible from said power cylinder and projecting downwardly therefrom; and

pin means connected to said piston rod and aligned with the apertures in said vertically spaced plates for extension therethrough.

4,015,856

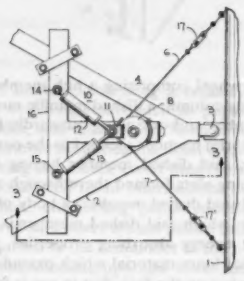
STABILIZER MECHANISM

William Van Smith, 1617 Duke St., Memphis, Tenn. 38108

Filed Oct. 7, 1975, Ser. No. 620,508

Int. Cl.² B62D *53/00*

U.S. Cl. 280—446 B **5 Claims**



1. A stabilizer mechanism adapted to be coupled between a towing vehicle and a towed vehicle for controlling swaying movement of such towed vehicle, the mechanism comprising:

force transferring means;

a cable having a first section adapted to be coupled to one lateral side of a rear end of a towing vehicle and subsequently being coupled to said force transferring means and a second section adapted to be coupled from said force transferring means to an opposite lateral side of the rear end of the same towing vehicle, whereby said cable sections are capable of transferring a force indicative of relative movement between a respective towing vehicle and towed vehicle to said force transferring means;

said force transferring means providing an output force corresponding to the force received from said cable;

force absorbing means coupled to receive the force from said force transferring means, said force absorbing means including at least one shock absorber having one end coupled to said force transferring means and its other end adapted to be pivotally coupled to a frame portion of a respective towed vehicle, said shock absorber serving to dampen forces applied to said force transferring means.

4,015,857

VEHICLE TRAILER HITCH

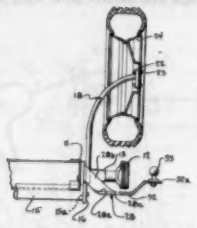
Anthony J. Ross, 526 - 74th St., and James A. Ross, 528 - 74th St., both of Holmes Beach, Fla. 33510

Filed Feb. 11, 1976, Ser. No. 657,163

Int. Cl.² B60D *1/14*

U.S. Cl. 280—495 **4 Claims**

1. In a recreational vehicle of the type including a frame having a rear frame cross member, a rear vehicle bumper spaced rearwardly from the rear frame cross member, and a holding tank dump tube having an outlet at a location substantially medially between the ends of the rear frame cross member, a trailer hitch comprising a generally U-shaped hitch bracket having spaced legs and a connecting web and mounting plates secured to the ends of said legs, said mounting plates being disposed in a generally upright plane and attached to said rear frame cross member at relatively opposite sides of the dump tube outlet, the spaced legs being formed of flat bar stock with their major transverse dimensions disposed in a generally upright plane at the point of attachment to the mounting plates and the said legs extending downwardly and rearwardly from the respective mounting plate to a level below the bumper, said web of said U-shaped hitch bracket being formed of two web sections of flat bar stock each integrally joined to a respective one of the legs and said two web sections of flat bar stock having the major transverse axis



thereof disposed in a generally horizontal plane with the longitudinal axis of said web sections converging rearwardly at a level below the underside of the rear vehicle bumper whereby to space the web portion of the hitch bracket rearwardly from the dump tube outlet a distance sufficient to provide access thereto, a tongue member attached to the converging ends of the web sections of the hitch bracket and extending rearwardly therefrom, and coupling means on the tongue member for connecting a trailer thereto.

4,015,858

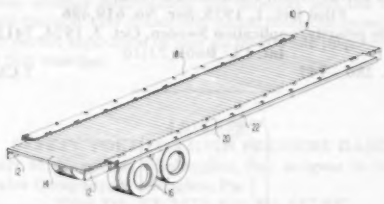
OVERWIDTH DEVICE FOR FLAT BED TRUCK OR TRAILER

Richard R. Love, Box 468, Buhl, Idaho 83316

Filed Mar. 23, 1976, Ser. No. 669,612

Int. Cl.² B62D *21/00*; B60P *1/00*

U.S. Cl. 280—656 **9 Claims**



1. A truck or trailer vehicle having a flat bed including a pair of horizontally disposed frame members arranged in spaced parallel relation to one another for supporting suitable decking in superimposed relation thereto, side plate members slidably positioned upon said decking and overlying each of said frame members, means carried by said frame members and engagable with said side plate members for slidably advancing the greater portion of said side plate members over and beyond said frame members to increase the area of said flat bed.

4,015,859

VEHICLE LEVELING SYSTEM

Robert W. Hegel, and Burke A. West, both of Monroe, Mich., assignors to Monroe Auto Equipment Company, Monroe, Mich.

Division of Ser. No. 489,728, July 18, 1974, Pat. No. 3,917,309. This application July 30, 1975, Ser. No. 600,432

Int. Cl.² B60G *11/28*

U.S. Cl. 280—714 **7 Claims**

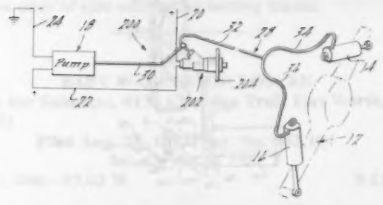
1. A vehicle leveling system control device for use in a

leveling system of the type including a pair of fluid pressure operated leveling struts, an electrically energized source of pressurized fluid and a fluid circuit communicating the source with the struts,

said control device including a housing defining a chamber communicable with said fluid circuit,

a piston within said housing having one side thereof exposed to the fluid pressure in said chamber,

a control stem adjustably connected with said piston and defining a passage communicable with the atmosphere,



electrical switching means normally maintaining an open electrical circuit between a source of electrical energy and said electrically energized source of fluid pressure,

said switching means being actuatable to a position closing said electrical circuit and thereby energizing said source of fluid pressure in response to a preselected movement of said stem within said housing, and

spring means acting against the opposite side of said piston from said side thereof exposed to said chamber.

4,015,860

VEHICLE SEAT SAFETY HARNESS

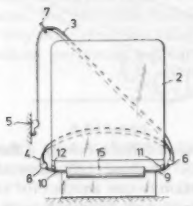
Claes-Gustav Erik Yngve Tisell, Strangnas; Karl Erik Björn Lundell, Bromma; Sven Henry Nilsson Hörner, Eskilstuna; Gustav Yngve Thorstensson, and Gustav Sven Erik Karlstedt, both of Sollentuna, all of Sweden, assignors to Forenade Fabriksverken, Eskilstuna, Sweden

Filed Oct. 1, 1975, Ser. No. 618,486

Claims priority, application Sweden, Oct. 3, 1974, 7412471

Int. Cl.² B60R *21/10*

U.S. Cl. 280—747 **7 Claims**



1. An arrangement for tensioning a strap upon or immediately prior to a collision between a vehicle and another object, the strap forming part of a vehicle seat safety harness and having opposite end portions comprising, in combination, strap tensioning means comprising a cylinder, two pistons, having mutually opposing end faces, said two pistons arranged for movement in said cylinder in mutually opposite directions, a chamber between the mutually opposing end faces of said pistons, and two lines attached respectively to each of said pistons and said strap opposite end portions for exerting a substantially simultaneous pulling action on the strap opposite end portions, force generating means for actuating said strap tensioning means thereby drawing the strap tightly against an individual seated in the vehicle seat and sensing means responsive to an impact or an imminent impact on the vehicle for actuating said force generating means.

4,015,861

STEERING WHEELS

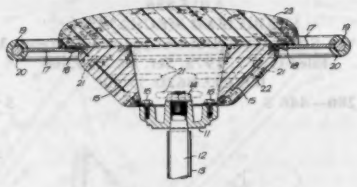
Peter Molyneux Finch, Oxford, England, assignor to British Leyland UK Limited, London, England

Filed June 4, 1975, Ser. No. 583,832

Claims priority, application United Kingdom, June 4, 1974, 24606/74

Int. Cl.² B60R *21/02*

U.S. Cl. 280—750 **1 Claim**



1. A steering wheel comprising a hub member for attachment to a steering column, a dished metallic member secured to said hub member and extending outwardly from said hub member, a wheel rim member secured to the periphery of said dished member; said dished member having a plurality of spaced overlapping slots formed therethrough and extending partially around said dished member; a body of rigid plastics foam material in which said dished member is embedded to improve impact energy absorbing properties, and a pad of semi-rigid plastics foam material which extends over at least said dished member on the face that in use is facing a driver.

4,015,862

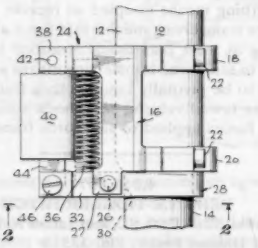
SHOCK ABSORBER LOCK

Clinton F. Bahrman, Burbank, and Thomas Ross Welch, Los Angeles, both of Calif., assignors to Clinton F. Bahrman, Burbank, Calif.

Filed Dec. 8, 1975, Ser. No. 638,323

Int. Cl.² B60R *27/00*

U.S. Cl. 280—754 **8 Claims**



1. A shock absorber lock comprising:

a yoke for attachment to the first shell of a two-shell axially operable shock absorber;

a collar pivoted on said yoke, a bore through said collar, said collar embracing the second shell of the shock absorber, said collar being pivoted on said yoke and being pivotable from a first position when said collar does not engage the second shell to a second position wherein said collar engages on and locks on the second shell to lock the shells with respect to each other; and

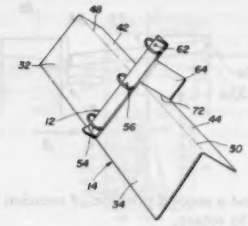
motor means interconnecting said yoke and said collar to move said collar from its nonengagement position to its engagement position.

4,015,863

EASEL BINDER

Edward T. Holum, Northbrook, Ill., assignor to Holum & Sons Co., Inc., Berkeley, Ill.

Filed July 17, 1975, Ser. No. 596,614
Int. Cl.² A47B *23/00*; B42D *3/00*
U.S. Cl. 281—33 **2 Claims**



1. An easel binder comprising a retainer mechanism for receiving and retaining items such as pages to be enclosed within the binder, said retainer mechanism including an elongated frame member mounting the inner ends of spaced spring flexured split ring assembles, cover means including front and back panels connected to an intermediate connecting panel, said intermediate connecting panel underlying said frame member, each of said cover means panels including an articulated portion joined to the remainder of the panels along bend lines located intermediate opposite lower and upper ends of said elongated frame member and extending transversely of said elongated frame member, said articulated portions being foldable along an apical portion from a first generally planar position to a second angularly extending position for supporting the binder in an easel providing position, a one-piece resilient sheet material member including an elongated planar base portion between said intermediate panel and said elongated frame member and substantially coextensive with both said panel and said frame member for entirely underlying said elongated frame member and the inner ends of said split ring assemblies, said one-piece resilient sheet material member including a flap portion normally disposed in the plane of said planar base portion and extending laterally from said planar base portion when said articulated panel portions are in said generally planar position, said flap portion being integrally articulated to a longitudinally extending margin of said base portion along a resilient junction located closely adjacent said apical portion between said upper end of said frame member and an adjacent transversely extending bend line and serving as the sole connecting means with said base portion independently of connection with the overlying frame member for permissive movement of said flap portion between said generally planar position and an angularly extending articulated cover portion retaining position, said sheet material being a tough resilient plastic material of predetermined thickness, and score means in said sheet material member at said junction for defining a relatively thin, easily bendable hinge therebetween, fastener means extending between and fixedly securing said remaining portion of the intermediate cover panel and said base portion with respect to said frame member, and additional fastener means located toward said upper end of the frame member and extending between and securing only said base portion and said frame member.

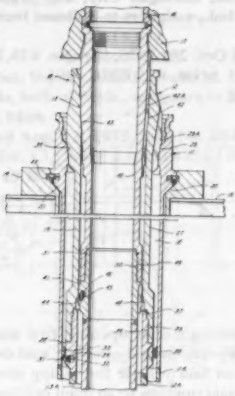
4,015,864

WELL APPARATUS

Edward J. Szymczak, Spring, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.

Filed Oct. 28, 1975, Ser. No. 626,231
Int. Cl.³ F16L *39/00*
U.S. Cl. 285—133 A **8 Claims**

1. An assembly for use in suspending casing within a well at an offshore location, comprising a first tubular member to which an outer casing may be connected for lowering into a well bore, said first member having an upwardly facing shoulder thereon, a second tubular member to which an inner casing may be connected for lowering into the well bore within the first member, said second member having a downwardly facing shoulder thereon landable on the shoulder on the first member to support the second member in spaced relation to the first member to define an annular space therebetween, and means on the inner surface of the first member



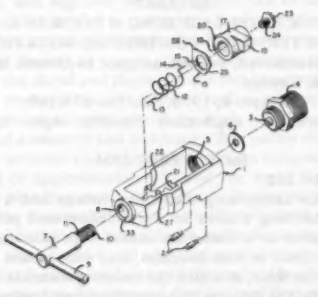
and outer surface of the second member for latching the second member down against upward movement when it has been landed on the first member, said second member including an upper tubular section on which the shoulder is formed and a lower tubular section on which the latching means is provided, and means sealably connecting the tubular sections to one another intermediate the shoulder and the latching means thereon, said connecting means being disconnectible so as to permit separation of said sections while disposed within said first member.

4,015,865

SAFETY YOKE FOR HIGH PRESSURE GASES

Robert M. Kongelka, Washington, Pa., assignor to Superior Valve Company, Washington, Pa.

Filed Feb. 13, 1976, Ser. No. 657,957
Int. Cl.² F16L *19/02*
U.S. Cl. 285—198 **11 Claims**



1. Safety yoke means for connection to a source of high pressure gas comprising a yoke body, cam means positioned within the yoke body and having portions adapted to engage the yoke body in locking relationship thereto, screw means

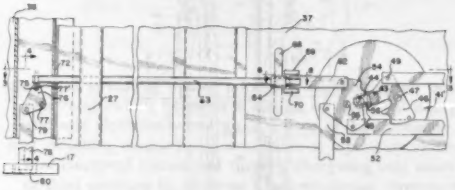
threadably engaging the cam means and operable to clamp a valve body against the yoke body, and locking means in cooperative relationship between the cam means and the screw means, said locking means being operable at all times when the cam means are not locked to the valve body and being moved to inoperative position when the cam means are in locking relationship to the yoke body.

4,015,866

OPERATING MECHANISM FOR DOUBLE SLIDING DOORS

Ronald W. Marsh, Michigan City, and Walter J. Marulic, Gary, both of Ind., assignors to Pullman Incorporated, Chicago, Ill.

Filed Oct. 28, 1975, Ser. No. 626,159
Int. Cl.² E05C 9/06
U.S. Cl. 292—36 **10 Claims**



1. A vehicle having a door opening, first and second doors positioned side-by-side in said opening, said doors being slidably supported on said vehicle for sliding movement from a position closing said opening to an open position to one side of said opening, said second door having a bolt locking member engageable with a portion of said vehicle to lock said second door in said opening, and a rotatable member on said second door connected to said locking member for moving the same between locking and unlocking position, the improvement of;

a door locking mechanism for said first door comprising,

a second locking bolt connected to said first door for relative sliding movement,

a keeper on said vehicle engageable by said second locking bolt,

an actuating element movably supported on said (first) door for reciprocating said second locking bolt,

actuating linkage mechanism including a rod slidably supported on said second door and being connected to said rotatable member for reciprocating movement in response to rotation of said rotatable member,

and means on said rod selectively engageable with said actuating element for moving the same whereby said second bolt is moved into and out of locking position relative to said keeper.

4,015,867

DEVICE FOR LATCHING A DOOR IN A PRE-DETERMINED POSITION OR ROTATION

Lars Siden, Hudiksvall, Sweden, assignor to Akustik Miljo AB, Hudiksvall, Sweden

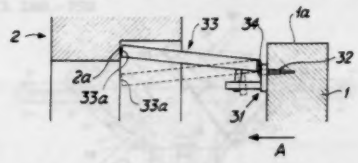
Filed Apr. 6, 1976, Ser. No. 674,169
Claims priority, application Sweden, Apr. 9, 1975, 75040444
Int. Cl.² E05C 3/04
U.S. Cl. 292—262 **5 Claims**

1. A device comprising a securing means and a latching means for latching a door in a pre-determined position of rotation relative to a frame associated with said door when rotating the door in one direction, and with means securely attached to the door, in which the securing means is arranged to co-act with the door at its upper horizontal edge surface, wherein

a. the latching means extends from the securing means in the form of a horizontally or substantially horizontally extending portion,

b. that the securing means and the latching means are pivotally arranged relative to each other and exhibit locking means which are adapted to co-act with each other so that the latching means is able to adopt one of two position of rotation relative to the securing means,

c. a first position of rotation in which rotation of the door is



prevented and a second position of rotation in which the door is free to rotate,

d. the securing means and the latching means are formed integrally,

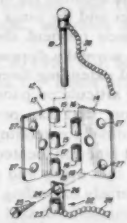
e. that said rotation of the latching means is effected via a thin portion formed between said latching means and said securing means.

4,015,868

DOOR LOCK EMPLOYING INTERLOCKING HINGE PLATES

Carl T. Buttler, Glendale, Ariz., assignor to Kenneth E. Marquis, Phoenix, Ariz.

Filed Feb. 12, 1976, Ser. No. 657,445
Int. Cl.² E05C 1/04
U.S. Cl. 292—302 **2 Claims**



1. A locking mechanism for the non-hinge side of a door like member pivotally mounted on a jamb comprising;

a pair of apertured metallic plates, one mounted on said door like member and the other mounted on said jamb so as to be juxtapositioned to each other when the door like member is closed,

each of said plates having ears extending laterally of their juxtapositioned edges which intermesh and coaxially align to define a bore for receiving a pin,

a pin for insertion into said bore to interlock said plates together in door closed position, and

chain means attached to one of said plates and said pin for securing said pin thereto when not inserted into said bore formed by the intermeshing ears of said plates,

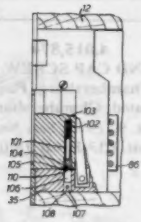
said means further comprising an apertured third plate having an open ended hollow cylinder mounted thereon for receiving and holding said pin when said plates are separated from each other,

said third plate being attached to one of said plates by a screw passing through the aligned aperture of said third plate and an aperture in one of said plates.

4,015,869
CATCH MECHANISM

Stephen Horvath, St. Ives, Australia, assignor to Access Control Systems Pty. Ltd., Melbourne, Australia

Filed Sept. 30, 1975, Ser. No. 618,119
Int. Cl.² E05B *15/02*
U.S. Cl. 292—341.16 **10 Claims**

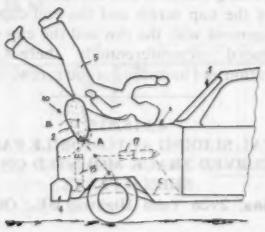


1. A door catch mechanism comprising a body; a catch member pivotally mounted on the body to pivot between an operative position and an inoperative position; biasing means biasing the catch member toward its operative position; power operated detent means having a first condition in which said catch member is held in said operative position and a second condition in which said catch member is released such that it can be moved to its inoperative position against the action of said biasing means by a moving force applied directly to the catch member from without the catch mechanism; and heat responsive locking means operable in response to application of heat thereto when said catch member is in its operative position to lock the catch member to remain permanently in said operative position regardless of the condition of the detent means.

4,015,870
FRONT PROTECTION DEVICE FOR MOTOR VEHICLES

Georges Stcherbatcheff, and André Lefeuvre, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault and Automobiles Peugeot, both of Paris, France

Filed May 28, 1975, Ser. No. 581,579
Claims priority, application France, May 30, 1974, 74.18751
Int. Cl.² B60R *21/14*
U.S. Cl. 293—32 **7 Claims**

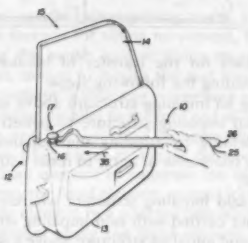


1. A pedestrian protection device extending across the front end of the body of a motor vehicle having a chassis comprising, in combination, a transversely extending beam disposed on the front end of the vehicle adjacent the vehicle upper surface for movement between an inoperative retracted position and an operative raised position, said beam having a curvilinear cross-sectional shape and a pair of side flanges, a first pivot trunnion associated with said side flanges and defining a transversely extending axis of rotation, first connecting means pivotably connected at one end to said first pivot trunnion and pivotally connected at its other end to the vehicle chassis to permit movement of said first transversely extending axis of rotation during the movement of said beam between said inoperative and operative positions, a second pivot trunnion associated with said side flanges and, defining a second transversely extending axis of rotation for said beam and second connecting means including a fluid pressure actuated cylinder pivotally connected to the vehicle chassis and having a piston operatively connected to said second pivot trunnion for pivotally moving said beam about said second axis of rotation between an inoperative retracted position and an operative raised position to increase the height of the front portion of the vehicle.

4,015,871
DOOR VALET

Claus E. Koerbel, Warren, and Kenneth M. McIntyre, Grosse Pointe Woods, both of Mich., assignors to Lunar Industries, Inc., Fraser, Mich.

Filed Aug. 13, 1975, Ser. No. 604,188
Int. Cl.² A47F *13/06*; B25J *1/00*
U.S. Cl. 294—19 R **2 Claims**



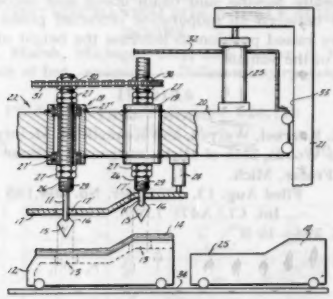
1. Apparatus for utilization by a person in a motor vehicle to unlock the doors of the vehicle by raising a door lock button having a stem of a first diameter and an enlarged head portion at the upper end of the stem, said apparatus comprising a relatively straight elongated handle having a longitudinal axis and substantially flat upper and lower surfaces generally parallel to one another, one end of said handle being adapted to be hand-held by said person and the opposite end including a lock button-engaging portion integral therewith, said lock button engaging portion terminating in a wedge having two spaced apart bifurcated legs separated by a longitudinal slot defining a pair of facing surfaces which are (a) substantially perpendicular to the flat upper and lower surfaces of the handle, (b) substantially parallel to the axis of the handle, and (c) spaced apart a distance of between about 0.25 and about 0.40 inches, the facing surfaces flaring outwardly near the end of the legs to facilitate insertion of the door lock button into the slot, said legs and the longitudinal axis of said slot being substantially parallel to the longitudinal axis of said handle so as to form an integral longitudinal extension thereof, each of said legs having an upper arcuate camming surface inclined toward the distal end thereof and a flat lower surface parallel to and coplanar with the lower surface of said handle, the upper arcuate camming surfaces each being essentially one-fourth of a sinusoid and including a first gently sloping portion at their terminal ends which blends into a more steeply sloping portion of approximately 45° and the more steeply sloping portion blending into a more gently sloping portion near the end of the slot, such that the manual application of a unidirectional, generally horizontal force in the direction of the longitudinal axis of said handle by said person causes said stem to be received within said slot and the underside of said enlarged head portion to be engaged first by said first gently sloping portion and the continued application of said force in said longitudinal direction causing the lock button to be engaged by said more steeply sloping portion to vertically cam the lock button upwardly to unlock said door.

4,015,872

IMPALING TRANSFER PROCESS AND APPARATUS

Edward J. Loznak, 306 E. Park, St. Johns, Mich. 48879, and Eugene L. Wood, 6785 Telegraph Road, Birmingham, Mich. 48010

Filed June 25, 1975, Ser. No. 590,049
Int. Cl.² B08B *1/00*
U.S. Cl. 294—61 7 Claims



1. A process for the transfer of blanket-like penetrable material including the following steps:

positioning an impaling structure above said material;

driving said impaling structure to penetrate said material and orienting by rotating the impaling structure to a position transverse of entry to resist withdrawal from said material;

elevating said impaling structure whereby said material is lifted and carried with said impaling structure;

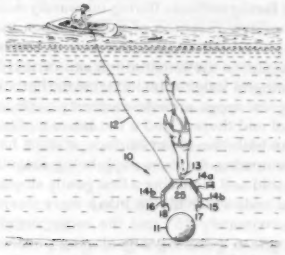
orienting said impaling structure above a work surface while reorienting the impaling structure by rotation to a position registrable with the entry to allow material withdrawal and stripping said material from said impaling structure to disengage said material therefrom and drop said material onto said work surface.

4,015,873

RETRIEVER

Arthur F. Langguth, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 22, 1975, Ser. No. 642,801
Int. Cl.² B66C *1/28*
U.S. Cl. 294—66 R 6 Claims



1. An apparatus for permitting the retrieval of a sunken object having a known dimension comprising:

means configured for gripping by a marine mammal;

means connected to the gripping means for fitting about the sunken object when positioned thereat by the marine mammal;

means carried on the fitting means for rotating to a position at least partially within the dimensions of the fitting means as the object is being positioned in the fitting means and for rotating to a position extending from the fitting means after the object has been positioned in the fitting means to lock the object therein;

means carried on the fitting means for reducing the weight of the apparatus; and

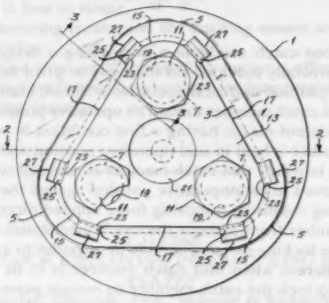
means carried on the fitting means for aurally indicating the positioning of the object in the fitting means to the marine mammal.

4,015,874

RAILWAY AXLE END CAP SCREW LOCKING DEVICE

James J. Hennessy, Chambersburg, Pa., assignor to Hennessy Products, Incorporated, Chambersburg, Pa.

Filed Sept. 9, 1975, Ser. No. 611,609
Int. Cl.² F16B *39/02*
U.S. Cl. 295—36 R 12 Claims



1. A locking device for a railway axle end cap screw having a polygonal head, comprising a plate having a circular aperture of sufficient size to accommodate the shank of the screw and a peripheral edge spaced radially from said aperture and shaped for anti-rotational relation with the inner surface of the adjacent portion of the end cap rim, and a pair of plate-like tabs substantially normal to the plane of said plate on said peripheral edge of said plate and intersecting said plate on normals to radii of said aperture, said tabs being wholly spaced radially from the center of said aperture a greater distance than the maximum radius of the cap screw head whereby to provide sufficient clearance for rotation of the cap screw into end cap securing position and being of substantially greater length than the thickness of the head of said cap screw and having their ends remote from said plate preformed to facilitate forcibly folding said tabs into the space between the polygonal head of the cap screw and the end cap rim whereby through engagement with the rim and the cap screw head at locations spaced circumferentially thereof, to prevent undesired rotation and loosening of the screw.

4,015,875

VERTICAL SLIDING AUTOMOBILE PARTITION HAVING CURVED TRACK MOUNTED ON FRONT OF SHIELD PLATE

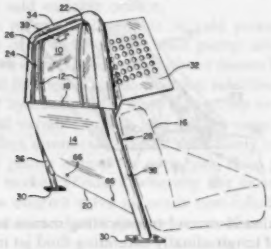
John R. Setina, 2926 Yelm Highway SE., Olympia, Wash. 98501

Filed Mar. 31, 1976, Ser. No. 672,404
Int. Cl.² B62D *33/04*
U.S. Cl. 296—24 R 18 Claims

1. Automobile partition apparatus comprising:

shield means for preventing objects from passing from the rear seat to the front seat of the automobile, said shield means adapted to extend across the width of the automobile at a position behind and separate from the front seat backrest and to extend from an upper edge adjacent the top of the front seat backrest downward along said backrest to a lower edge;

a substantially unbreakable, light transparent partition means for enabling visual observation over the shield means extending from the upper edge of said shield to the roof of the automobile, said partition means being separate from said backrest and including a vertical sliding partition window which slides along the front surface of the shield between an open position lowered below said upper edge of said guard plate and located between the shield and said backrest, and a closed position raised above said shield;



vertically curved track means for supporting said partition window and for vertical sliding movement, and preventing pivotal movement of said partition window so that said partition window does not project behind said shield;

means for attaching said track means to the front surface of said shield so that said track means extends along said shield and upward above the shield to form a portion of said partition means; and

mounting means for attaching the shield means and the partition means to the body of the automobile as an integral unit which can be removed without damage.

4,015,876

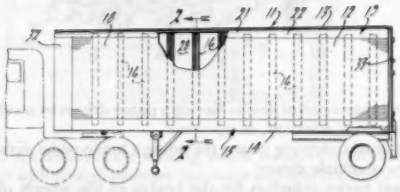
WEDGE TYPE TRAILER BODY

Adrian F. Hulverson, Grosse Pointe Woods, and Eugene Chosy, Grosse Pointe Farms, both of Mich., assignors to Fruehauf Corporation, Detroit, Mich.

Filed May 11, 1972, Ser. No. 252,264

Int. Cl.² B62D *33/04*

U.S. Cl. 296—28 M **6 Claims**



6. In a wedge type trailer body to be mounted on front and rear wheels, an underframe which slopes downwardly toward the rear when supported on the front and rear wheels, side walls comprising upper and lower side rails, respectively, a plurality of spaced posts of substantially equal length extending fron one of said rails at right angles thereto, the other of said side rails having a vertically extending flange of a width to overlap the ends of said posts when the top edge of said upper side rail is disposed in a substantially horizontal plane and the bottom edge of said lower side rail slopes downwardly generally parallel to said underframe.

4,015,877

VEHICLE SEAT ASSEMBLIES

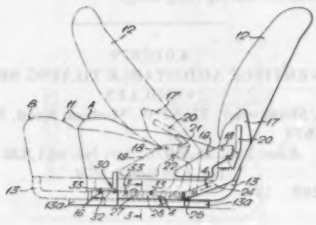
John Charles Gladstone Button, Warwick, England, assignor to Chrysler United Kingdom Limited, London, England

Filed Mar. 3, 1975, Ser. No. 554,670

Claims priority, application United Kingdom, Mar. 7, 1974, 10337/74

Int. Cl.² B60N *1/04*

U.S. Cl. 297—341 **2 Claims**



1. A vehicle seat assembly comprising a seat, a seat squab pivotally mounter thereon for tilting movement, first locking means for locking the squab against tilting movement with respect to the seat, means to mount the seat for bodily fore and aft sliding movement, a slideway comprising a fixed elongate element extending parallel to the fore and aft direction of movement of the seat, a U-section elongate slide element which receives the fixed element, means between the slide element and the fixed element to constrain the slide element to slide linearly along the fixed element, second locking means for locking the slide element in a selected one of a plurality of positions of adjustment along the fixed element, the squab having an arm with an end extending therefrom towards the slide and a link pivotally connected at one of its ends to the slide and pivotally connected at its other end to the end of the arm so as to permit the end of the arm to rise and fall with respect to the slide as the squab is tilted with respect to the seat, the arrangement being such that, with the first locking means only released, tilting the squab forwardly over the seat moves the seat forwardly along said mounting means, and, with the second locking means only released, the seat with the squab locked thereto can be adjusted fore and aft on said mounting means.

4,015,878

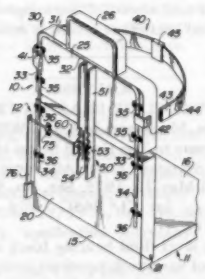
CHAIR CONSTRUCTION FOR LONG USE COMFORT

Charles M. Perkins, R.F.D. No. 2, Albion, Ill. 62806

Filed Jan. 16, 1976, Ser. No. 649,719

Int. Cl.² A62B *35/00*

U.S. Cl. 297—385 **8 Claims**



1. A chair construction comprising a seat for supporting gravitational load of a user, a lower back part upstanding from a rear region of said seat, an upper back part generally over

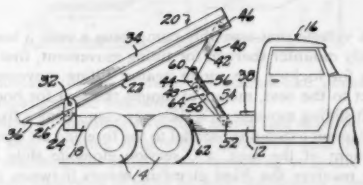
said lower back part for engaging the back of a user, mounting means mounting said upper back part for up and down movement in a generally vertical plane away from and toward said seat over said rear region of the latter, a belt carried by said upper back part for snug vertically supporting engagement about a user's torso, and retaining means for releasably retaining said upper back part in a selected position of said up and down movement, whereby a user's torso is adapted to be elevated generally vertically away from while remaining on the seat for lessened pressure on the user's buttocks and increased comfort during long usage.

4,015,879

CONVERTIBLE ADJUSTABLE TILTING BED FOR VEHICLES

Forest M. Shonkwiler, 22652 W. Madison Road, South Bend, Ind. 46614

Filed Feb. 26, 1976, Ser. No. 661,830
Int. Cl.² B60P *1/04*
U.S. Cl. 298—14 **5 Claims**



1. In combination,
a vehicle having a frame,
bracket means carried by the rear portions of the sides of said vehicle frame,
a dump bed carried by said vehicle frame and including frame members juxtaposed to said bracket means,
releasable means for pivoting said dump bed frame members to said bracket means,
folding support means connecting the front of said dump bed to said vehicle frame and including pivotally connected upper and lower arms,
power actuated extensible and contractible means pivoted at its opposite ends to said vehicle frame and to an intermediate portion of the upper arm of said folding support means, and
releasable means for anchoring the lower arm of said folding support means to said vehicle frame, whereby
said dump bed may be tilted about said pivot means upon operation of said power actuated means when said anchor means is released and said dump bed may be shifted bodily on said vehicle frame to and from inclined ramp forming position at the rear of said vehicle frame upon operation of said power actuated means when said anchor means locks said lower folding support arm to said vehicle frame and said pivot means is released.

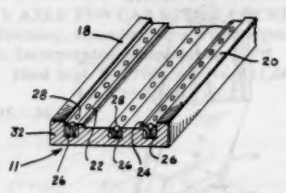
4,015,880

MULTIPLE LEVEL FLUID BEARING TRACK ASSEMBLY

Ronald L. Colvin, Mesa, and James H. Williams, Tempe, both of Ariz., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 21, 1975, Ser. No. 579,746
Int. Cl.² B65G *53/04*
U.S. Cl. 302—31 **3 Claims**

1. A multiple level fluid bearing track assembly for transporting articles of various dimensions comprising a body, said body having a centrally located longitudinally extending base portion of a predetermined height, a first pair of longitudinally extending shoulders adjacent said base portion, said base portion and said first pair of shoulders forming a lower level of said track assembly, first means for transporting articles of one dimension in a predetermined direction, said first transporting means being in the form of a longitudinally extending fluid jet insert located within said base portion intermediate said first pair of shoulders, said body having a second pair of longitudinally extending shoulders spaced a predetermined distance in the transverse direction from said first pair of shoulders, second means for transporting articles of another dimension in said same predetermined direction as said articles of said one



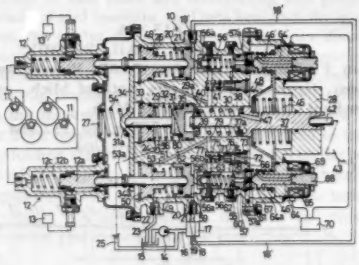
dimension, said second transporting means being in the form of a pair of longitudinally extending fluid jet inserts of a height greater than said predetermined height of said base portion, each of said pair of inserts being located adjacent one of said second pair of shoulders, respectively, and forming in conjunction therewith an upper level of said track assembly whereby articles of various dimensions can be interchangeably or simultaneously transported in said predetermined direction by said track assembly.

4,015,881

BRAKE CONTROL DEVICE

Yoshiharu Adachi, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed July 15, 1974, Ser. No. 488,458
Claims priority, application Japan, July 28, 1973, 48-85239
Int. Cl.² B60T *8/06*
U.S. Cl. 303—114 **5 Claims**



1. A brake control device having a pump driven by a vehicle engine and a reservoir, comprising:
a manual operating means including a brake pedal actuated by a vehicle driver;
wheel brake cylinders for the brakes of the wheels of the vehicle;
operating means operatively connected with said brake pedal for actuating said wheel brake cylinders;
pressure control valve means operatively connected with said operating means and including a hollow seat member provided with a normally open passage therethrough and a valve seat thereon, said valve seat cooperating with a first valve member for selectively controlling the amount of flow of hydraulic fluid from said pump to said reservoir;
flow control valve means fluidly communicating with said

pump and including a second valve member cooperating with a valve seat and forming a variable orifice for controlling communication between said pump and said reservoir and a fixed orifice associated with said second valve member for restricting the flow of hydraulic fluid supplied to the normally open passage of said pressure control valve means;

power chamber means in hydraulic communication with said pump; said second valve member being responsive to the pressure in said power chamber means and the amount of flow through said passage for varying the opening of said variable orifice;

power piston means reciprocable in said power chamber means and disposed between said pump and said flow control valve means, said power piston means being operable by said first valve member which selectively restricts the flow of hydraulic fluid from said pump to said reservoir via said variable orifice and said passage; and

master cylinders connected to and selectively operable by said power piston means for supplying fluid pressure to said wheel brake cylinders, whereby the variable orifice of said flow control valve means is controlled according to the movement of said pressure control valve means.

4,015,882

ANTI-FRICTION BEARING

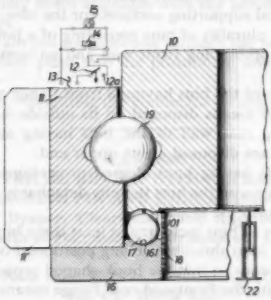
Alois Stenert, Lippstadt, Germany, assignor to Hoesch Werke Aktiengesellschaft, Dortmund, Germany

Filed Apr. 11, 1975, Ser. No. 567,189

Claims priority, application Germany, Apr. 13, 1974, 2418056

Int. Cl.² F16C *9/00;* **G08B** *21/00*

U.S. Cl. 308—1 A **8 Claims**



1. An anti-friction bearing which includes inner and outer rings with complementary raceways and anti-friction elements in said raceways between said rings to support a load on said bearing, opposed, complementary auxiliary raceways unitary with said rings for receiving anti-friction elements therebetween, detector means to indicate excessive relative translation movement of said inner and outer rings undr load, comprising a detector element carried by one ring and cooperating with means fixed on the other ring upon excessive relative translation movement of said rings under load, and signalling means actuated by said detector means upon such excessive movement, said auxiliary racewwys receiving anti-friction elements for cooperation with said anti-friction bearing to support said load.

4,015,883

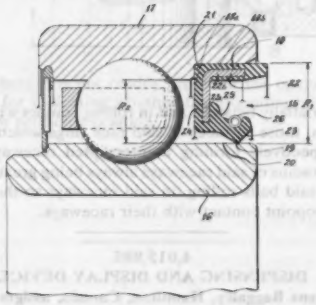
ANNULAR SEALING MEMBERS AND ASSEMBLIES INCORPORATING THEM

Geoffrey Taylor, Luton, England, assignor to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands

Continuation of Ser. No. 408,894, Oct. 23, 1973, abandoned. This application June 13, 1975, Ser. No. 586,652

Int. Cl.² F16C *1/24, 33/78*

U.S. Cl. 308—187.1 **8 Claims**



1. In a bearing assembly including coaxial inner and outer race rings defining between them an annular gap having a central part and a first end part, a plurality of captive rolling elements in said central part of the gap and seal means closing said first end part of the gap, the improvement in combination therewith, wherein said outer race ring defines a bore having axially adjacent first and second surfaces of first diameter and smaller second diameter respectively, with a shoulder surface extending transversely of the assembly axis between said first and second surfaces, and said inner race ring has a third surface on its outer circumference which is spaced from and defines with said first surface said end part of said gap, and said seal means comprises an annular body part of flexible, resilient material formed of outer and inner rings and a web connecting said seal means rings which, with said web, define in axial section, a C-shape having outer and inner circumferential seal surfaces respectively for sealingly contacting said first and third surfaces of said outer and inner race rings and said web has an axial surface for sealingly contacting said shoulder of said outer race ring, said seal means further comprising a reinforcing part of less flexible material than said body part material, said reinforcing part defining in axial section an L-shape and comprising a ring part embedded in said seal means outer ring and web at least partially embedded in the web of said seal means body part, said seal means outer seal surface, when in free state having an outer diameter slightly greater than said inner diameter of said outer ring first seal surface, and said seal means outer seal surface, when situated in and closing said first end part of said gap, being radially compressed in an interference fit.

4,015,884

CENTER-FREE ONE-ROW WIRE BALL BEARING

Johannes Bertram, Unna-Billmerich, and Heinz Wolzenburg, Dortmund, both of Germany, assignors to Hoesch Werke Aktiengesellschaft, Dortmund, Germany

Filed Dec. 17, 1975, Ser. No. 641,752

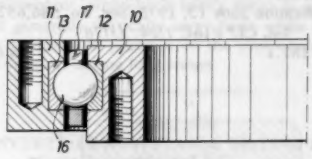
Claims priority, application Germany, Dec. 19, 1974, 2460120

Int. Cl.² F16C *33/58*

U.S. Cl. 308—216 **8 Claims**

1. A center-free one-row ball bearing which includes in combination: a one-piece inner bearing ring and a one-piece outer bearing ring arranged in radially spaced relationship and

coaxially with regard to each other, only two race wires respectively arranged in said inner ring and said outer ring so as to radially face each other in radially spaced relationship to each other, said race wires being located radially with regard to the axis of rotation of said bearing, and a plurality of balls



arranged radially between and in rolling contact with said two race wires, those surfaces of said race rings which face each other respectively forming uninterrupted raceways for said balls, the radius of said raceways always being greater than the radius of said balls rolling on said raceways so that the balls have a twopoint contact with their raceways.

4,015,885

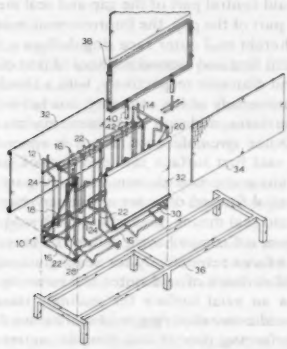
DISPENSING AND DISPLAY DEVICE

Jon Clemens Baggaley, Hamilton, Canada, assignor to Tonecraft Limited, Toronto, Canada

Filed Mar. 1, 1976, Ser. No. 662,957

Int. Cl.² A47F 7/00; B65H 19/00

U.S. Cl. 312—42 **3 Claims**



1. A display and storage device for rolls of decorative sheet material comprising

a body having a series of storage racks each adapted to support a single file column of rolls of decorative sheet material with their roll axes parallel and horizontal;

a front display face on said body for each of said storage racks that substantially conceals its respective storage rack and has a width substantially equal to the width of its storage rack;

said storage racks being arranged one above the other and the front display faces of said storage racks being in a substantially common vertical plane;

said racks each having a depth greater than the depth but less than twice the depth of a roll of decorative material to be contained thereby whereby to support said rolls in a single file comumn as aforesaid;

said front display face being formed with a dispensing opening for rolls of decorative sheet material adjacent the lower end of said storage rack whereby the bottom roll of said column can be withdrawn from said column;

said storage racks each terminating in a support ledge adjacent said dispensing opening;

said body being formed with a filling opening for admitting rolls of decorative sheet material to said storage rack;

similar rolls of decorative material being loadable in each of said storge racks;

said front display faces having a vertical extent substantially coextensive with the vertical height of their respective storage rack and a horizontal extent substantially coextensive with the lateral extent of their respective storage rack whereby said front display faces can display the full width of a substantial length of the decorative sheet material of the rolls of decorative sheet material in a column in their respective rack.

4,015,886

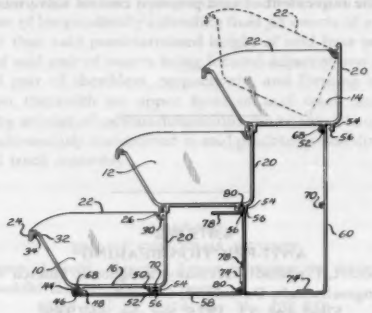
STORAGE BINS

Chester H. Wickenberg, 1125 Forest Drive, Elgin, Ill. 60120

Filed Nov. 3, 1975, Ser. No. 627,849

Int. Cl.² A47B 77/00, 87/00; F16B 12/00; A47B 81/00

U.S. Cl. 312—107 **12 Claims**



1. A storage and display system comprising:

a plurality of bins adapted to be stacked and detachably interlocked in a vertical array;

tier-supporting means including at least two brackets adapted to be detachably interlocking to form horizontal and vertical supporting surfaces for the bins;

each of said plurality of bins consisting of a bottom, a substantially upstanding front wall and an upstanding rear wall;

each bottom of the bins having a front flange means and a rear flange means disposed on its outside surface, each upstanding rear wall of the bins having an additional flange means disposed on its upper end;

said brackets having hook-shaped projections adapted to interengage with the bins thereby detachably interlocking the bins onto the brackets;

said plurality of bins including at least three bins, a first bin of said at least three bins being positioned onto the supporting means so that the hook-shaped projections interengage with the front and rear flange means on the bottom of said first bin;

a second bin of said at least three bins being stacked above said first bin by interengaging so as to detachably interlock said additional flange means on the upper end of the rear wall of the first bin with the front flange means on the bottom of the second bin and by interengaging so as to detachably interlock the rear flange means on the bottom of the second bin with said supporting means; and

a third of said at least three bins being stacked above the first and second bins by interengaging so as to detachably interlock said additional flange means on the upper end of the rear wall of the second bin with the front flange means on the bottom of the third bin and by interengaging so as to detachably interlock the rear flange means on the bottom of the third bin with said supporting means.

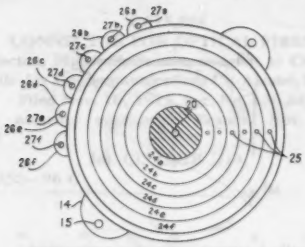
4,015,887
LAMP CIRCUIT CONNECTOR FOR TRAILERS

Joseph H. Ross, 1719 San Jose Ave., Almeda, Calif. 94501, and Dudley G. Richardson, 40 Woodland Way, Piedmont, Calif. 94611

Continuation-in-part of Ser. No. 558,941, March 17, 1975, abandoned. This application June 1, 1976, Ser. No. 691,478

Int. Cl.² H01R *39/00*

U.S. Cl. 339—6 R **5 Claims**



1. A connector device for connecting the lamp circuit of a tractor vehicle to the lamp circuit of a trailer vehicle, comprising:

a. a base member;

b. a plurality of different diameter nonconducting rings rotatably disposed one within the other on the base member, each ring having a connector member on its under surface and a positioning hole on its upper surface;

c. a first set of conductors attached to the connector members of the rings and attachable to the lamp circuit of one of the vehicles;

d. a plurality of contactor plates radially disposed on the base member, each contactor plate having connector members adapted for making electrical contact with the connector members of the rings;

e. a second set of conductors attached to the connector members of the contactor plates and attachable to the lamp circuit of the other of the vehicles;

f. a face plate rotatably disposed over the rings, and having positioning holes alignable with the positioning holes of the rings;

g. a program pin for insertion through the positioning hole of the face plate into the positioning holes of the rings; and

h. means for mounting the connector on one of the vehicles.

4,015,888
ELECTRICAL DEVICE WITH RETRACTABLE GROUNDING PIN AND INDICATING MEANS

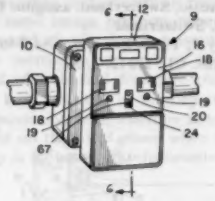
Charles W. Draper, Clearwater, and Raymond H. Legatti, Belleair, both of Fla., assignors to Square D Company, Park Ridge, Ill.

Filed Nov. 5, 1975, Ser. No. 629,163

Int. Cl.² H01R *3/06*

U.S. Cl. 339—14 P **10 Claims**

1. An electrical device selectively pluggable into electrical outlets with either two or three ports and in which two of the ports are connected to power lines, the electrical device comprising a body having a cavity closed by front and rear walls, two prongs operatively connected within the cavity and projecting from the body through the rear wall for reception respectively in the ports of an outlet which are connected to power lines, a grounding pin operatively connected within the cavity and mounted for movement between an extended position wherein the pin extends from the body through an opening in the rear wall for reception in a third port of the outlet and a retracted position wherein the pin is retracted within the cavity, means for locking the grounding pin in the extended position, and a plunger mounted for reciprocal movement between a position wherein an outer end portion of the plunger is readily visible at an opening in the front wall to a



position where it is not readily visible at the opening in the front wall for indicating whether the grounding pin is in its extended or retracted position.

4,015,889
SHUNT FOR PROVIDING A DIRECT ELECTRICAL CONNECTION

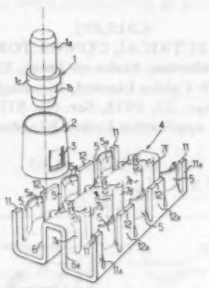
Lucien Blanchet, Le Vesinet, France, assignor to Air LB, Colombes, France

Filed Oct. 20, 1975, Ser. No. 624,059

Claims priority, application France, Nov. 12, 1974, 74.37278

Int. Cl.² H01R *13/12, 31/08*

U.S. Cl. 339—19 **3 Claims**



1. Shunt device for making a direct electrical connection between a plurality of male plugs at the ends of electrical conductors, said device comprising

an elongated metal strip formed from a single sheet of resilient metal and defining two parallel channels, each channel having a bottom, an internal wall adjacent the other channel, and an external wall more remote therefrom

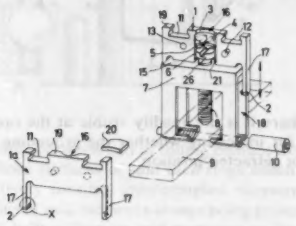
said internal walls being connected together along their upper ends and formed with a plurality of pairs of elongated parallel bosses transverse to the bottoms of said channels and projecting into said channels,

said external walls being divided along lines transverse to said channel bottoms into a plurality of tongues parallel to said bosses, one tongue being positioned opposite each pair of bosses and acting as a spring to grip a plug inserted between that tongue and the pair of bosses thereopposite.

4,015,890
IDENTIFICATION MEMBER FOR ELECTRICAL TERMINALS

Gottfried Glaesel, Minusio, Switzerland, assignor to Heco Electric GmbH, Glarus, Switzerland

Filed May 7, 1976, Ser. No. 684,346
Int. Cl.² H01R 3/00
U.S. Cl. 339—113 B 11 Claims

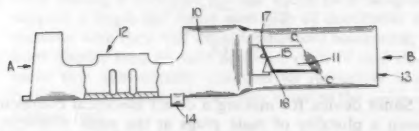


1. An identification member for attachment to an uninsulated electrical terminal comprising a metal sleeve and a clamping screw located in a wall thereof, which identification member consists of two plates of insulating material provided with means for securing the plates together face to face, each of the two mating faces containing a recess extending thereacross to accommodate the clamping screw, at least one plate having a pair of generally parallel laterally spaced legs at opposite sides thereof and retaining detent members on the legs for engaging in the ends of a said sleeve of a terminal to retain the identification member thereon, at least one recess being provided in that side of each plate that faces away from the legs, adapted to receive an identifying plate or tag.

4,015,891
ELECTRICAL CONNECTOR

Donald Stuart Pemberton, Stoke-on-Trent, England, assignor to Rist's Wires & Cables Limited, Birmingham, England

Filed Apr. 22, 1975, Ser. No. 571,015
Claims priority, application United Kingdom, May 1, 1974, 19081/74
Int. Cl.² H01R 13/40
U.S. Cl. 339—217 S 7 Claims

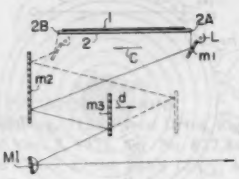


1. An electrical connector comprising an elongate, electrically conducting body, one end of said body being formed to be connected with a bared end of an electrical lead, an opposite end of said body being formed to be engaged with another electrical connector, and at least one lance longitudinally extending from said body intermediate said ends thereof for opposing disengagement of the electrical connector from a recess in a housing for the connector, said lance having an edge at a free and thereof said edge extending across said lance which is angled relative to said body forming a point for digging into said housing so that one end of said edge of said lance lies further away from a longitudinal axis of said body and nearer to said opposite end of said body than an opposite end of said edge of said lance.

4,015,892
OPTICAL SCANNING SYSTEM FOR SLITWISE EXPOSURE

Yasuhiro Tabata, Kawasaki, Japan, assignor to Ricoh Co., Ltd., Japan

Filed Mar. 15, 1976, Ser. No. 667,140
Claims priority, application Japan, Mar. 17, 1975, 50-32013
Int. Cl.² G02B 27/17
U.S. Cl. 350—6 7 Claims

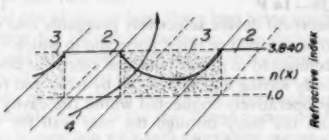


1. An optically scanning apparatus comprising;
a. means for maintaining a material to be scanned stationarily within a predetermined area in a plane,
b. means for lighting the material,
c. first reflector means movable between opposite ends of said predetermined area along a fixed path parallel to said plane at a rate for reflecting a light flux from successive slitwise areas of an image of said material,
d. second reflector means disposed stationary adjacent to one of said area ends for reflecting the flux reflected by said first reflector means,
e. third reflector means movable along a fixed path at a rate having a component, in a direction parallel to said plane, which is proportional to the rate of movement of said first reflector means but reverse in direction of movement, for reflecting the flux reflected by said second reflector means,
f. means focusing the flux reflected by said third reflector means, and
g. means controlling the movements of said first and third reflector means.

4,015,893
COMPOUND SEMICONDUCTOR OPTICAL INTEGRATED CIRCUIT HAVING ISOLATION ZONES FOR LIGHT TRANSMISSION

Takuo Sugano, Tokyo, and Yoshifumi Mori, Ichikawa, both of Japan, assignors to Kentaro Hayashi, President, University of Tokyo, Tokyo, Japan

Division of Ser. No. 403,303, Oct. 3, 1973, abandoned. This application Aug. 25, 1975, Ser. No. 607,855
Claims priority, application Japan, Oct. 12, 1972, 47-102280
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 WG 1 Claim



1. A compound semiconductor optical integrated circuit having isolation zones for light transmission comprising a compound semiconductor substrate selected from a group consisting of GaP and GaAs, a compound semiconductor layer of $GaAs_{0.6}P_{0.4}$ applied through an epitaxial growth on said substrate, and plasma oxide films in a given pattern in the

compound semiconductor layer formed to a depth extending to the compound semiconductor substrate and forming isolation zones for light transmission, the compound semiconductor layer having a constant refractive index greater than the refractive index of the plasma oxide films and the refractive index of the oxide films gradually decreasing from the boundary with the compound semiconductor layer in the direction of oxide film inside, the compound semiconductor layer between the oxide films serving as a light transmission path.

4,015,894

CONNECTOR FOR OPTICAL FIBRES

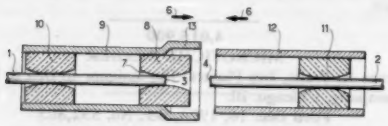
Lucien Rocton, Malakoff, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Nov. 10, 1975, Ser. No. 630,645

Claims priority, application France, Nov. 13, 1974, 74.37418

Int. Cl.² G02B *5/14*

U.S. Cl. 350—96 C **9 Claims**



1. A connector for optical fibres having a very small diameter, wherein two ends to be connected are inserted on both sides in a duct crossing through a part made of a synthetic stone basically containing alumina, constituting a connecting part, the diameter of said duct being very close to that of the fibres.

4,015,895

ZOOM LENS SYSTEM HAVING ENLARGED RANGE OF VARIATION IN MAGNIFICATION

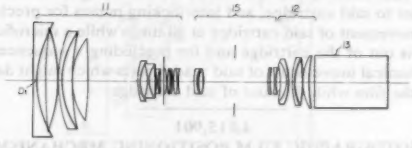
Ryusho Hirose, Machida, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 432,204, Jan. 10, 1974, abandoned. This application Aug. 14, 1975, Ser. No. 604,484

Claims priority, application Japan, Jan. 18, 1973, 48-8118

Int. Cl.² G02B *15/02*, *15/14*

U.S. Cl. 350—183 **1 Claim**



1. A zoom lens system having an enlarged range of variation in magnification, comprising:

an afocal zoom lens section, having a focusing lens group, a variator lens group, a compensator lens group and a fixed convergent lens group composed of a plurality of lens elements;

a diaphragm arranged between the compensator lens group and the fixed convergent lens groups;

a convergent image forming lens arranged apart and a certain length from the convergent lens group of the zoom lens section; and

an afocal extending assembly for changing image magnification composed of a front convergent group and a rear divergent group being axially apart from the front convergent group, said front convergent group and said rear divergent group being composed of a plurality of spherical lenses, said assembly being removably inserted between the convergent lens group of the zoom lens portion and the convergent image forming lens, said zoom lens system having an increased focal length when said assembly is inserted in comparison to the focal length of the zoom lens when said assembly is removed while maintaining the same image position, wherein said converging group in said afocal extending assembly is composed of a negative meniscus lens and an axially spaced positive lens, and wherein said divergent group is composed of a positive lens arranged at the object side and an axially spaced biconcave lens, whereby an image of equal quality is formed on the focal plane when the afocal extending assembly is mounted and dismounted.

4,015,896

REFLECTING-LENS OBJECTIVE

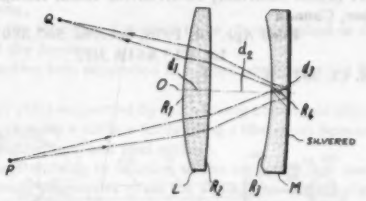
Günther Sonnet, Bad Kreuznach, Germany, assignor to Jos. Schneider & Co., Bad Kreuznach, Germany

Filed July 9, 1975, Ser. No. 594,230

Claims priority, application Germany, July 10, 1974, 2433062

Int. Cl.² G02B *17/08*

U.S. Cl. 350—201 **1 Claim**



1. A reflecting-lens objective consisting of a biconvex lens and a negative-meniscus lens with a silvered convex surface air-spaced from said biconvex lens, the radii R_1 - R_4 and the thicknesses and separation d_1 - d_3 of said lenses, based upon an overall focal length of 100, their refractive indices n_e and their Abbe numbers ν_e being substantially as given in the following Table:

		n_e	ν_e
$R_1 = +\ 43$	$d_1 = 3.9$	1.55	63
$R_2 = -\ 238$	$d_2 = 9.3$	air space	
$R_3 = -\ 49$	$d_3 = 2.4$	1.66	45
$R_4 = -\ 664$	(silvered) .		

4,015,897

FOUR ELEMENT LENS SYSTEM

Kunihiko Konoma, Sakai, Japan, and Kaname Satou, Torrance, Calif., assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 2, 1975, Ser. No. 573,869

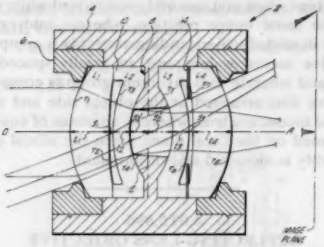
Claims priority, application Japan, July 11, 1974, 49-79900

Int. Cl.² G02B *9/36*

U.S. Cl. 350—209 **32 Claims**

1. A lens system adapted for use on a camera comprising in a direction from the object to image side of the lens system, a first positive meniscus lens convex to the object side, a second negative meniscus lens convex to the object side, a third negative meniscus lens of the same shape as the second lens and convex to the image side, a fourth positive meniscus lens of the same shape as the first lens and convex to the image side, the optical axis of each lens being aligned, and means for setting the point of intersection for the principal rays defining

the maximum field angle and the optical axis, between the second and third lens, so that the point of intersection is on the



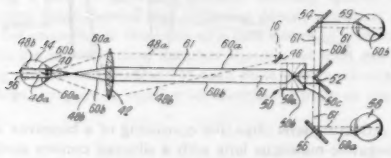
second lens side relative to the center of symmetry of the distance between the second and third lenses.

4,015,898

UPRIGHT WIDE ANGLE STEREO OPHTHALMOSCOPE

Kurt Ernest Schirmer, 56 Granville Road, Hampstead, Quebec, Canada

Filed Apr. 14, 1975, Ser. No. 567,850
Int. Cl.² A61B 3/12
U.S. Cl. 351—6 **9 Claims**



1. An ophthalmoscope having an elongate linear housing and an objective lens at one end of the housing for passing a bundle of rays from the fundus of an eye, a single inversion roof top prism in the housing optically aligned with the objective lens, said prism including means for inverting, reversing and separating the rays passing therethrough, binocular means connected to the housing for passing the rays emitting from said prism to the left eye and to the right eye through respective eyepieces, said binocular means having a common axis with the objective lens and the rays passing through the left and right eyepiece providing a stereo upright unreversed image of the retina to the observer.

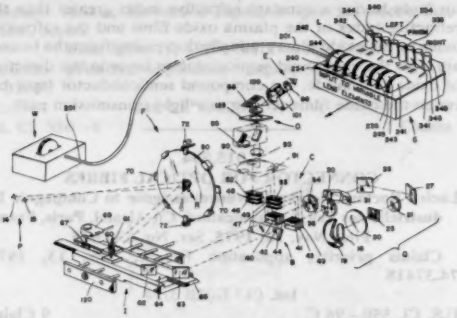
4,015,899

EYE TEST APPARATUS WITH PHYSICIAN ROUTED PATIENT INPUT ADJUSTMENT TO VARIABLE OPTICAL ELEMENTS

William E. Humphrey, Oakland, Calif., assignor to Humphrey Instruments, Inc., Berkeley, Calif.

Filed Oct. 22, 1975, Ser. No. 624,808
Int. Cl.² A61B 3/02
U.S. Cl. 351—17 **12 Claims**

1. An eye testing apparatus including in combination a patient viewing station for testing at least one eye of a patient; a target for view by said patient located along at least one view path for one eye; first correction optics in said view path between said patient viewing station and said target, said first corrective optics including first variable spherical optics to vary the spherical correction of said target and first variable astigmatic optics to vary the astigmatic correction of said target; first means for varying said first variable spherical optics responsive to a first input; second means for varying said first astigmatic optics responsive to a second input; a patient input adjacent said patient viewing station; and, means for selectively connecting at an eye examiner station said patient input to said first input to said first variable spherical



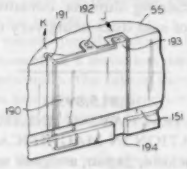
optics and to said second input to said first variable astigmatic optics.

4,015,900

MICROFICHE READER

Thomas R. Wells, Des Plaines, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Dec. 16, 1974, Ser. No. 532,803
Int. Cl.² G03B 23/08, 23/14
U.S. Cl. 353—27 R **18 Claims**



1. A microfiche reading system of a type which uses a cartridge containing a library file of microfiche film stored in a spaced parallel relationship, carrier means for receiving a selected film from said file and for transporting said film with a rectilinear motion through said reader, extraction means for removing said selected film from said cartridge, for inserting it into said carrier, and for thereafter returning it from said carrier to said cartridge, and interlocking means for precluding movement of said cartridge at all times while a microfiche film is out of the cartridge and for precluding a sequence of mechanical movements of said reader parts which might damage the film while it is out of said cartridge.

4,015,901

PHOTOGRAPHIC FILM POSITIONING MECHANISM

Harry Arthur Hele Spence-Bate, 115 Cheam Place, Morley, Australia 6062

Filed June 13, 1975, Ser. No. 586,656
Claims priority, application Australia, July 4, 1974, 70860/74
Int. Cl.² G03B 27/42
U.S. Cl. 355—53 **28 Claims**

1. A positioning mechanism comprising a frame, a carrier element mounted for forward and reverse movement along a linear path, said element being connected to a cam follower,

a cylindrical positioning means mounted for rotational movement on said frame, the positioning means having an axis of rotation substantially parallel with said path,

at least one helical first groove defining a camway formed on the positioning means, said cam follower having a first engagement portion of a width substantially that of the camway,

at least one depression in said camway into which the fol-

lower is adapted to be received, said cam follower being adapted for movement forward or away from the said axis of rotation of the positioning means into or out of the depression,

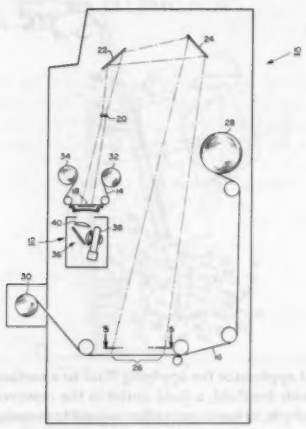
whereby said carrier element is located in a predetermined position without lateral movement of said follower in said depression.

4,015,902

ILLUMINATION SYSTEM FOR CONTINUOUS PATH ENLARGER

Ellis I. Betensky, Toronto, Canada, assignor to Fimacon Associates, Rochester, N.Y.

Filed Oct. 31, 1975, Ser. No. 627,779
Int. Cl.² G03B *27/32, 27/48, 27/52, 27/70*
U.S. Cl. 355—60 **34 Claims**



1. Apparatus for illuminating an original for projecting an image thereof onto a recording sheet moving synchronously with the original comprising:

a. an illumination system including a plurality of separate illumination sources, each arranged for illuminating a portion of the width of an original; and

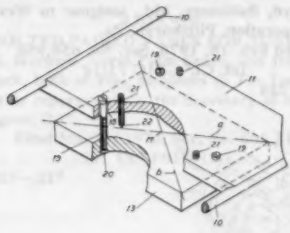
b. each of said illumination sources including a light source and a lens system, each lens system including a final element having side edges at an acute angle to the direction of travel of said sheet through an exposure area therefor.

4,015,903

MICROFILM CAMERA APPARATUS

Hans Zimmet, and Manfred Wiessner, both of Dresden, Germany, assignors to VEB Pentacon Dresden, Germany

Filed Dec. 20, 1974, Ser. No. 534,771
Claims priority, application Germany, Dec. 27, 1973, 175652
Int. Cl.² G03B *27/58*
U.S. Cl. 355—72 **5 Claims**



1. A micro-film camera including:

a. a housing,

b. a table for receiving a subject to be photographed at the base of the housing,

c. an objective lens supported in a fixed position above the table,

d. a carrier plate supported by the housing above said objective lens having a surface for holding a film sheet between the objective lens and said surface,

e. a carriage slidable in relation to the objective lens associated with the carrier plate for sliding the carrier plate into and out of an operative position, and

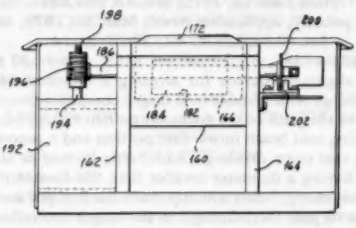
f. means connecting said carrier plate to said slidable carriage, said means comprising three retaining screws, passing through the slidable carriage and screwed into the carrier plate, which screws form the angles of a triangle which includes the geometric centre of the carrier plate, and, associated with each retaining screw, a support screw which passes through the slidable carriage and abuts the carrier plate, by means of which the distance between the carrier plate and the slidable carriage can be adjusted at each of the angles of said triangle.

4,015,904

OPTICAL SHOE ASSEMBLY FOR USE WITH A MULTI-SENSOR OPTICAL HEAD

Joseph De Remigis, New Market, Canada, assignor to Sentrol Systems Ltd., Downsview, Canada

Division of Ser. No. 450,894, March 13, 1974, Pat. No. 3,936,189. This application July 7, 1975, Ser. No. 593,439
Int. Cl.² G01J *1/02*
U.S. Cl. 356—243 **4 Claims**



1. In optical apparatus for measuring optical characteristics of a web, an optical shoe assembly over which said web is adapted to pass, an optical shoe assembly including a member

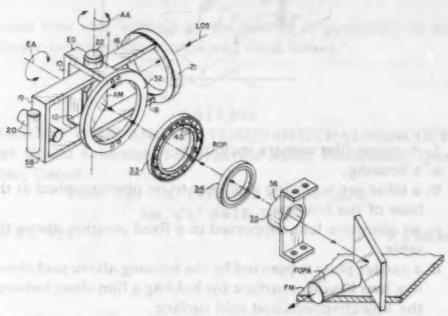
having a plurality of sides, means on a first side of said member providing spaced white and black backgrounds, a black standard carried by a second side of said member, a white standard carried by a third side of said member, and means mounting said member adjacent to said web for selective movement of said sides into operative relationship with said web.

4,015,905

TARGET SIGHTING DEVICE

Wayne B. Lloyd, Baltimore, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 18, 1976, Ser. No. 658,950
Int. Cl.² G01C *15/14*
U.S. Cl. 356—248 **4 Claims**



1. An improved target sighting device comprising,
a vertically-disposed elevation gimbal having a horizontal elevation axis extending therethrough,
small-diameter shaft means pivotally supporting a rear portion of said gimbal with respect to said elevation axis,
large diameter ring bearing means pivotally supporting a forward portion of said gimbal with respect to said elevation axis,
a flat mirror pivotally supported on said gimbal about a vertical azimuth axis for aiming target information from one side of said gimbal in a direction along said elevation axis toward the center of said ring bearing means, and
an annular flex pivot means interposed between said ring bearing means and said gimbal,
said flex pivot means being relatively rigid with respect to transmission of force in straight linear directions and relatively yieldable to a limited extent circumferentially about its central axis.

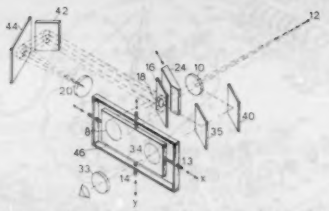
4,015,906

METHOD AND APPARATUS FOR ALIGNING AN INVISIBLE BEAM PARTICULARLY A LASER BEAR

Uzi Sharon, Tel-Aviv, Israel, assignor to Laser Industries, Ltd., Tel-Aviv, Israel

Filed June 23, 1975, Ser. No. 589,591
Claims priority, application Israel, Mar. 14, 1975, 46832
Int. Cl.² G02B *23/04, 27/14, 23/14*
U.S. Cl. 356—138 **32 Claims**

1. An alignment device for aligning a focussed beam of radiant energy with respect to a target comprising:
means in the path of the focussed radiant energy beam for dividing said beam into a first portion and a second portion, said beam dividing means being formed as an aperture having a diameter smaller than the diameter of the radiant energy beam which permits the first portion of the beam to pass therethrough to the target and reflects the remainder of said radiant energy beam to form said second portion of the beam;
a shutter for selectively intercepting said first portion of the beam between said beam dividing means and said target;
a sighting member intercepting said second portion of the beam;
an optical system for viewing the sighting member and the target with said sighting member and said target imaged on one another; and



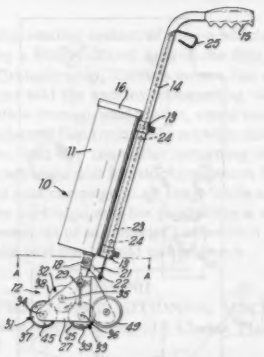
means for adjusting the position of said first portion of the beam on said target by adjusting the position of said second portion of the beam on said sighting member while said sighting member and said target are imaged on one another.

4,015,907

FLUID APPLICATORS

Guy Bryan Lodge, Island Farm Ave., West Molesey, Surrey, England

Continuation-in-part of Ser. No. 564,333, April 2, 1975, abandoned. This application Oct. 9, 1975, Ser. No. 621,124
Claims priority, application United Kingdom, July 7, 1975, 15268/75
Int. Cl.² A46B *11/00;* **B44D** *3/22*
U.S. Cl. 401—48 **21 Claims**

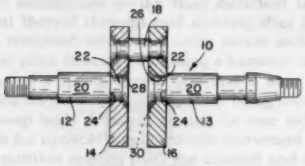


1. A fluid applicator for applying fluid to a surface, comprising a reservoir for fluid, a fluid outlet in the reservoir, two side frame members, at least one roller assembly mounted between the side frame members, said assembly comprising at least two rollers, at least one of which is situated so as to receive fluid from the outlet, at least two of the rollers being arranged one behind the other so as to roll over the surface to be marked and to apply the fluid to the surface in a single line, each roller comprising a spindle and a cylindrical sleeve of an absorbent material removably mounted on the spindle, the ends of each spindle being journalled in respective side frame members, means releasably connecting at least one of said side frame members to said spindle whereby said side frame can be removed to permit said sleeve to be removed from a respective spindle for cleaning or replacement.

4,015,908
MULTIPLE-PIECE CRANKSHAFT

Allan J. Ashley, North Aurora, Ill., assignor to Amsted Industries Incorporated, Chicago, Ill.

Filed Mar. 18, 1976, Ser. No. 668,136
Int. Cl.² B25G *3/28*
U.S. Cl. 403—274 **3 Claims**

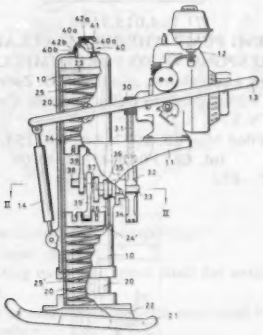


1. A multiple-piece crankshaft comprising: a shaft having a body portion and a smaller diameter portion at one end forming a shoulder; at least one crank arm having an opening therethrough, said opening being chamfered at one end; a plurality of keyways in and parallel to said chamfer; the smaller diameter portion of said shaft being received in said opening with said shoulder abutting said crank arm on the face thereof opposite said chamfer and with said smaller diameter portion extending into said chamfer; said smaller diameter portion being conformed to fill said chamfer and to substantially fill said keyways so as to be rigidly locked in assembled relationship with the crank arm.

4,015,909
TAMPING MACHINE

Shinzo Yamamoto, 21-1 Kajiyama 2-chome, Tsurumi, Yokohama, Kanagawa, Japan

Filed July 27, 1976, Ser. No. 709,020
Claims priority, application Japan, Jan. 24, 1976, 51-7149[U]
Int. Cl.² E01C *19/34*
U.S. Cl. 404—133 **4 Claims**

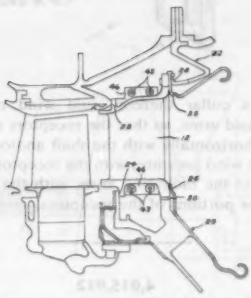


1. A tamping machine comprising a vertically long casing having a lower end open, a prime mover supported on said casing, a cylinder snugly mounted in said casing so as to be vertically movable therein and having upper and lower ends respectively closed, a foot member fixed to said cylinder at the lower end thereof exposed out of said casing lower end, a pair of pistons each snugly mounted in said cylinder so as to be vertically movable therein as a unit, a pair of coiled springs disposed in said cylinder respectively between the closed upper end thereof and one of said pistons and between the closed lower end of said cylinder and the other piston, a drive shaft having an outer end drive-transmittingly connected with said prime mover via transmission means and transversely extending through bearings mounted at the wall of said casing and a vertically long slot formed in the wall of said cylinder so as to dispose the inner end of said drive shaft between said two pistons, and crank means drive-transmittingly connected with said drive shaft inner end so that rotation output drive of said prime mover may subject the unit of said pistons to vertical reciprocation and consequently said two springs to alternate compression for causing vibrating reciprocation of said foot member.

4,015,910
BOLTED PAIRED VANES FOR TURBINE

Kenneth E. Harmon, North Palm Beach, and John L. Mayers, Lake Park, both of Fla., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 9, 1976, Ser. No. 665,216
Int. Cl.² F01D *1/02*
U.S. Cl. 415—217 **1 Claim**



1. In the first stage of a gas turbine having an inner stator support assembly; an outer stator support assembly; a plurality of paired vane sections; means for circumferentially retaining the paired vane sections between the inner and outer stator support assemblies; means for axially retaining said paired vane sections and means for radially retaining the said paired vane sections; said paired vane sections comprising first vane members each including a turbine vane and an inner and outer vane platform; second vane members each including a vane and an inner and outer vane platform; said inner and outer vane platform of the first and second vane members including means for interconnecting the first and second vane members; said means for interconnecting the first and second vane members including flanges on the inner and outer vane platforms of the first vane members and flanges on the inner and outer vane platforms of the second blade members and means for removably securing the flanges of the first vane members to the flanges of the second vane members.

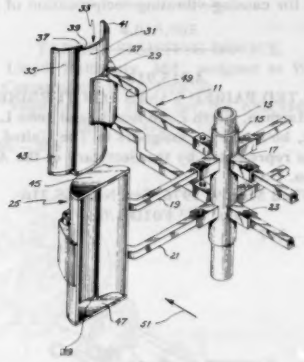
4,015,911
HIGHER EFFICIENCY WIND MOTOR WITH RECEPTORS OF DIMINISHED DRAG CHARACTERISTICS

Arthur Darvishian, 5314 Sheridan Drive, Williamsville, N.Y. 14221

Continuation-in-part of Ser. No. 432,031, Jan. 9, 1974, Pat. No. 3,897,170. This application July 28, 1975, Ser. No. 599,656
Int. Cl.² F03D *3/06*
U.S. Cl. 416—119 **7 Claims**

1. A self-adjusting wind motor comprising a plurality of wind receptors that move substantially in the plane of the wind, which automatically are presented to the wind in positions of higher resistance to the wind when moving in the direction of the wind and move into positions of lower resistance to the wind when moving against it, said automatic

adjustment of positions being caused by the action of the wind and centrifugal force on the receptors, said receptors each having an opening therein for passage of wind therethrough during operation thereof when moving across the wind and against the wind to diminish resistance to said movements, a substantially vertical shaft and a plurality of arms held to the



shaft or to a collar thereon, said wind receptors being mounted on said arms, so that the receptors and arms rotate substantially horizontally with the shaft and/or collar thereon in response to wind pressure, with the receptors being pivoted with respect to the mounting arms, with the pivot locations being on outer portions of the receptors.

4,015,912

ELECTROMAGNETIC PUMPING DEVICE FOR LIQUIDS

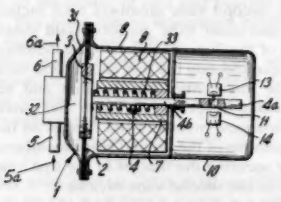
Siegfried Kofink, Zell (Neckar), Germany, assignor to J. Eberspacher, Germany

Filed Mar. 20, 1975, Ser. No. 560,494

Claims priority, application Germany, Mar. 23, 1974, 2414165

Int. Cl.² F04B *17/04*

U.S. Cl. 417—417 **6 Claims**



1. A pump, comprising a housing having a pumping chamber with an inlet to said pumping chamber and a discharge from said pumping chamber, a pumping diaphragm having a portion arranged in said pumping chamber and being displaceable to pump liquid from said inlet to said pumping chamber and out said discharge, an electromagnet having an armature portion connected to said diaphragm, return spring means acting on said armature to move it away from said electromagnet, a power circuit connected to said electromagnet to energize said electromagnet and attract said armature portion to move it against said spring means and to flex said diaphragm to pump liquid, said power circuit having a photocell switch therein to connect and disconnect said electromagnet, said armature having a part with an opening movable by movement of said armature portion to and away from alignment with said photocell switch to cyclically actuate said photocell switch and said armature.

4,015,913

DIAPHRAGM AIR PUMP

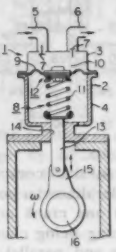
Hirokazu Nakamura, Kyoto, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 27, 1975, Ser. No. 553,473

Claims priority, application Japan, Dec. 20, 1974, 49-145543

Int. Cl.² F16J *1/10*; F04B *19/22*, *45/04*

U.S. Cl. 417—471 **3 Claims**



1. A diaphragm air pump comprising a housing, a flexible diaphragm mounted in the housing to define a compression chamber therewithin, one way check valves located in the inlet and outlet ports of the housing, and a coil spring fixed at its one end to said diaphragm and operatively connected at its other end to one end of a first rod positioned for only axial movement, and a connecting rod, being the drive member for the air pump, and having one end pivotally connected to the other end of said first rod, the other end of the connecting rod being rotatably mounted on a cam mounted on a shaft driven by an engine of a motor vehicle and adapted to transmit actuating and retracting forces from the shaft to the diaphragm through said coil spring, whereby output of the pump is high at low or middle revolutions of the engine but is low at high revolutions thereof when the engine shaft revolutions are greater than the natural frequency of an assembly formed of said coil spring and flexible diaphragm, said coil spring being on the axis of said first rod.

4,015,914

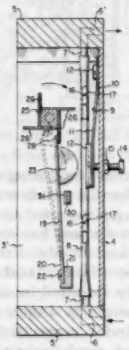
METERING PUMP WHEREIN TUBULAR PUMP IS RESPONSIVE TO FORCE IMPULSES

Jack Kushner, Lindenhurst, and Henry G. Zwirblis, Nesconset, both of N.Y., assignors to Delta Scientific Corporation, Lindenhurst, N.Y.

Filed May 18, 1972, Ser. No. 254,718

Int. Cl.² F04B *43/08*, *45/06*

U.S. Cl. 417—478 **4 Claims**



1. A metering pump comprising:

a. a pump body having at least one inlet and outlet means;

b. a tubular conduit connected between each inlet and outlet means, the wall of said conduit being of resilient material which is flexible in a direction transverse to the length of the conduit; and

c. transmitting means for periodically imparting against the conduit force impulses having a magnitude and duration sufficient to move discrete quantities of fluid through said conduit in substantially synchronized relationship to the impingement of said force impulses on said conduit and to impart momentum to the fluid sufficient to sustain movement thereof through said conduit after the force has been removed, said transmitting means including:

1. a striker plate structure including a hammer-like member having a spring biased arm and a head element mounted on the arm, said structure being mounted on said pump body adjacent to and on one side of the conduit for cyclical tapping action movement between a first position spaced from the conduit and a second position in contact therewith to deliver said force impulses thereto, each force impulse causing flexure of the conduit and each force impulse having a relatively short duration with respect to the recovery time of resilient conduit wall, and

2. drive means for actuating said hammer-like member, said drive means including:

i. a driven rotor, and

ii. at least one lifter element mounted on the rotor for engagement with said arm upon rotation of the rotor to thereby cause movement of said hammer-like member between said first and second positions.

4,015,915

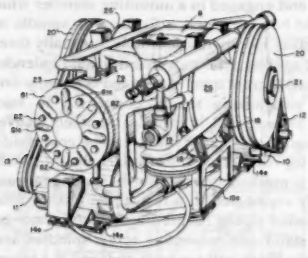
OIL FREE COMPRESSOR

James A. Hardman, 1095 Hyland Lake Drive, Salt Lake City, Utah 84121

Filed Nov. 20, 1972, Ser. No. 308,015

Int. Cl.² F01L *15/14*; F04B *7/04*

U.S. Cl. 417—490 **7 Claims**



1. An oil free compressor comprising

at least one input shaft;

means mounting each said input shaft for axially rotational movement;

a rotor fixed to and rotatable with each said input shaft;

a shuttle member;

means coupling each said rotor to one end of the shuttle member, said means including a metal ball member in which said shuttle member reciprocates and rotationally oscillates and a metal socket fixed to and carried by said rotor and surrounding a portion of said ball member, the surface of the ball member engaging the socket being harder than the surface of the socket that engages the ball member;

means for lubricating the engaging surfaces of the ball member, and the shuttle member and the ball member and the socket, said means for lubricating including

an oil tight rotor housing having oil therein into which the rotor dips during rotation of the rotor,

a groove formed around the rotor,

stripper means at an upper part of the housing extending into the groove to block oil centrifugally held in the groove, and

means for directing oil from the stripper means to the means coupling each said rotor to the shuttle member;

a piston shaft journaled on said shuttle member and secured against movement axially therealong;

a compressor cylinder; and

piston means in said cylinder, connected to said piston shaft and reciprocal and rotatable with said piston shaft whereby air input and output from said cylinder is regulated by said piston means.

4,015,916

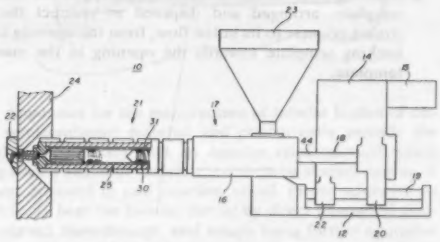
HEATING AND STRATIFICATION DEVICE FOR AN INJECTION MOLDING MACHINE

Nickolas N. Sokolow, Cheshire, Mass., assignor to Beloit Corporation, Beloit, Wis.

Filed Nov. 28, 1975, Ser. No. 635,791

Int. Cl.² B29F *3/08*

U.S. Cl. 425—242 R **13 Claims**



1. An injection molding machine including a plasticizing unit, said plasticizing unit comprising a barrel, a reciprocal and rotatable screw means for plasticizing and feeding plastic material towards the outlet end of said barrel, said screw means being disposed within said barrel, said improvement comprising:

a combination heat transfer and stratification device,

said device being disposed in fluid communication with the outlet of said screw means, and being disposed within a forward portion of said barrel,

said device defining a generally tubular shaped open ended structure having radially extending ribs,

said ribs extending longitudinally and substantially continuously along the length of the device to stratify plastic melt,

heating means in close proximity to said device for supplying heat to said device, and

said tubular section conducting heat along said ribs, and into said plastic material.

4,015,917

APPARATUS FOR MAKING REINFORCED WICKET HOLE DIRECTIONALLY TEAR PRONE

Alvin E. Ericson, Chicago, Ill., assignor to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 446,060, Feb. 26, 1974. This application July 3, 1975, Ser. No. 593,129

Int. Cl.² B28B *1/48*

U.S. Cl. 425—290 **1 Claim**

1. Apparatus for making an apexed hole having a varying thickness hole edge perimeter of melted and rehardened plastic film sheet material comprising, in combination;

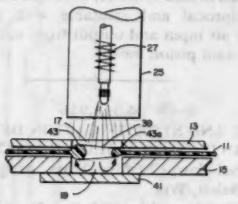
a masking template having an opening of size and apexed shape substantially congruent with a preselected size and apexed shape of the hole to be formed;

a backing template having an opening of size and shape

substantially similar to the size and shape of the opening in the masking template;

clamping means to hold the masking template and the backing template juxtaposed with their respective said openings in substantially concentric alignment;

hot gas stream supply means arranged and disposed to impinge a hot gas stream on the masking template epicentrically towards the apex of the concentric centerline of the openings in the templates; and



a closure means contiguous to the opening in the backing template, arranged and disposed to redirect the gas stream counter to its initial flow, from the opening in the backing template towards the opening in the masking template.

4,015,918

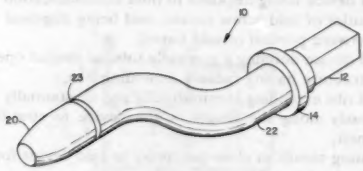
HOSE MOLDING DEVICE

Donald J. McPhee, Littleton, and Mark A. Newberry, Lakewood, both of Colo., assignors to The Gates Rubber Company, Denver, Colo.

Filed June 25, 1975, Ser. No. 590,367

Int. Cl.² B29C *17/00*

U.S. Cl. 425—403 **15 Claims**



14. An assembly for curing hose comprising:

a generally cylindraceous member with at least one curved portion between two generally straight first and second end portions and having a circumferential groove near the second end portion;

a radial collar secured to the cylindraceous member near the first end portion, the collar defining a first hose end molding surface; and

a removable collar comprising a stretchable elastomeric sleeve having at least one circumferential element end that defines a second hose end molding surface, and means integrally molded at and extending inwardly of the internal diameter of the sleeve in the form of a molded circumferential bead near the circumferential element end wherein the sleeve has a diameter less than the second end of the cylindraceous member, and the bead is nestable within the circumferential groove, the sleeve stretched over the second end portion and a bead retained in the circumferential groove.

4,015,919

MULTI-ROLL CALENDER FOR RUBBER OR SYNTHETIC PLASTICS MATERIALS

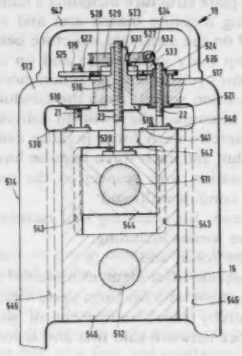
Werner Pawelczyk, Hannover, Germany, assignor to Hermann Berstorff Maschinenbau GmbH, Hannover-Kleefeld, Germany

Filed Apr. 30, 1976, Ser. No. 681,856

Claims priority, application Germany, May 24, 1975, 2523088

Int. Cl.² B29C *15/00*

U.S. Cl. 425—367 **3 Claims**



1. In a multi-roll calender for rubber or synthetic plastics material a pair of rolls with a gap therebetween and mounted at their ends in a calender stand, in which at each of the ends of said pair of rolls, said pair of rolls are rotatably mounted in a bearing block which can be moved to move said pair of rolls together with respect to said calender stand with said gap between said two rolls of the pair rolls maintained constant, one of the rolls of said pair of rolls is displaceable relative to said bearing block and to the other roll of said pair of roll by having its end engaged in a mounting member which displaceable in said bearing block, a fixed screw spindle is secured to said mounting member, a rotatable internally threaded sleeve is secured against axial movement in said calender stand and has said fixed screw spindle engaged therein, a drivable worm wheel is rotationally rigidly connected to said internally threaded sleeve, said internally threaded sleeve carries an electromagnetic coupling which can be energised to entrain a spur gear for rotation with said internally threaded sleeve, said spur gear is meshed with two further spur gears each rotationally rigidly connected to a respective further rotatable internally threaded sleeve secured against axial movement in said calender stand and respective screw spindles are secured to said bearing block and are each engaged in a respective one of said further rotatable internally threaded sleeves.

4,015,920

DEVICE FOR PRODUCING MOLDED ARTICLES FROM FOAMABLE PLASTICS

Jean-Pierre Niederst, Schottmar, and Karl Holzinger, Bad Oeynhausen, both of Germany, assignors to Herbert Kannegiesser Kommanditgesellschaft, Vlotho, Weser, Germany

Filed June 13, 1975, Ser. No. 586,768

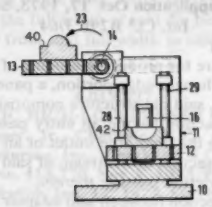
Claims priority, application Germany, June 14, 1974, 2428831

Int. Cl.² B29C *1/16*

U.S. Cl. 425—451.9 **5 Claims**

1. In a device for producing molded articles from foamable plastics, such as polyurethane, wherein a bipartite mold in which the molded articles are foamed is secured to two clamping plates of a mold carrier disposed on top of one another and one of the two clamping plates is movable towards the other clamping plate and returnable to its initial position while

maintaining it parallel position to the other clamping plate by means of working cylinders, the improvement comprising: the second clamping plate of said mold carrier which is not movable by means of the working cylinders is mounted to be pivotable out of its position with respect to the first clamping plate about a pivot axis disposed laterally thereto through an



angle of at least 180° from a parallel position with respect to the first clamping plate, and the mold carrier with the two clamping plates is pivotable about a first axis parallel to the pivot axis of the second clamping plate and about a second axis disposed at right angles to its first axis and laterally with respect to the two clamping plates.

4,015,921

CONTINUOUSLY OPERATING PRELIMINARY PRESS OR FINISHING PRESS FOR THE MANUFACTURE OF PARTICLE BOARDS, SUCH AS CHIP BOARDS, FIBER BOARDS AND THE LIKE

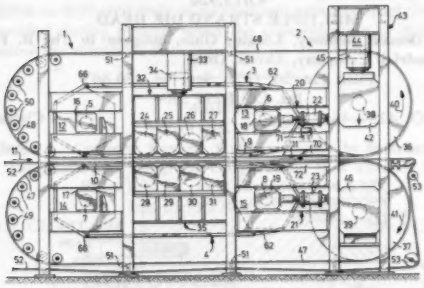
Albert De Mets, Roeselare, Belgium, assignor to Konstruktiewerkhuizen, DeMets N.V., Belgium

Filed Aug. 27, 1975, Ser. No. 608,343

Claims priority, application Belgium, Aug. 27, 1974, 147937

Int. Cl.² B29C *15/00*

U.S. Cl. 425—371 **20 Claims**



1. In a press for the manufacture of particle boards comprising two endless plate belts arranged one above the other to define a material-treatment path therebetween, said endless plate belts being mounted for revolution around polygonal drums, the improvement wherein at least one of said plate belts includes a plurality of essentially rectangular belt plates, directly and pivotally mounted to one another, so that adjacent belt plates pivotally move with respect to one another around only a single mutual pivotal axis, said belt plates being mounted to one another only along the lateral edges of said belt plates, each face of each of said belt plates defining at the leading and trailing edges of each belt plate a series of projections and recesses for meshing with the recesses and projections of adjacent belt plates, the projections and recesses on one face of each belt plate edge being arranged alternatively with respect to the projections and recesses on the other face of the same belt plate edge.

4,015,922

APPARATUS FOR THE MANUFACTURE OF TUBULAR BODIES OF SEMICONDUCTOR MATERIAL

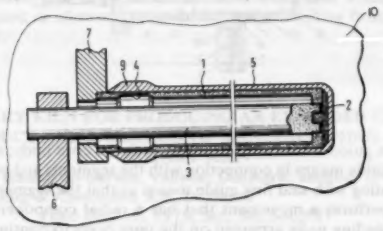
Wolfgang Dietze, Munich; Ronrad Reuschel, Vaterstetten, and Andreas Kasper, Garching-Hochbruck, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Division of Ser. No. 417,380, Nov. 19, 1973, Pat. No. 3,979,490, which is a continuation of Ser. No. 205,492, Dec. 7, 1971, abandoned. This application Feb. 18, 1976, Ser. No. 658,892

Claims priority, application Germany, Dec. 9, 1970, 2060651

Int. Cl.² B29D *23/00*

U.S. Cl. 425—471 **8 Claims**



3. Apparatus for the manufacture of tubular bodies of silicon semiconductor material and concurrently provide the tubular-shaped body with an annular reinforcement which comprises a reaction vessel, a rod or tube-shaped carrier of carbon disposed in said reaction vessel, means operative to electrically heat the tubular carrier by direct passage of electric current therethrough, said means being further operative to heat said carrier at at least one local annular zone of the external surface to a different temperature than that of the remaining carrier surface said heating being effected by passage of an electric current from an energy source through said carrier body, said reaction vessel containing reaction gases of hydrogen and a silicon halide which is in contact with said heated carrier and precipitates silicon induced by said carrier heated to a temperature sufficient to cause precipitation out of said reaction gases of a layer of semiconductor material on the surface of said carrier, with more rapid precipitation of silicon on the surface of said local annular zone due to its different temperature causing formation of an annular reinforcement on said tubular shaped body of silicon semiconductor material.

4,015,923

DEVICE FOR PRODUCING EXPANSIONS IN PLASTICS PIPES AND PIPE COMPONENTS

Ilkka Järvinen; Erkki Salmela, both of Lahti, and Antero Kaikkonen, Nastola, all of Finland, assignors to Upo Osakeyhtio, Finland

Filed Jan. 5, 1976, Ser. No. 646,738

Claims priority, application Finland, Jan. 20, 1975, 750127

Int. Cl.² B29C *17/00*

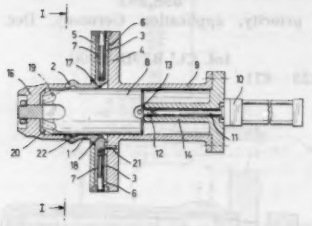
U.S. Cl. 425—393 **8 Claims**

1. A device for producing expansions and in particular inside grooves, such as packing grooves, in plastics pipes and pipe components. which comprises

a form ring for shaping the inside profile of the expansion, the circumference of which ring is divided into two groups of segments which can be shifted radially inwards so that the form ring can be disassembled and removed from the pipe after shaping of the expansion such that in the disassembled position, one group of segments will be situated radially inside the other group of segments, said other group of segments being provided with an internal circumferential groove into which part of the outer circumference of said one group of segments can be located in said disassembled position;

a mandrel that can be shifted axially through the form ring, and comprising two groups of inclined surfaces, one surface group for each segment group so as to produce radial movement of the segments, the first group of inclined surfaces being arranged axially at a distance from the second group of inlcined surfaces;

a core body that surrounds the madrel and in relation to which the mandrel can be shifted axially;



first guide means in connection with the core body; second guide means in connection with the segments and cooperating with said first guide means so that the segments can perform a movement that has a radial component; and loading units arranged on the core body to continuously drive said second guide means radially inwards.

4,015,924

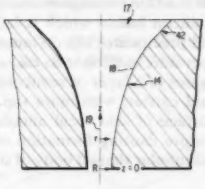
SPINNING APPARATUS PROVIDING FOR ESSENTIALLY CONSTANT EXTENSIONAL STRAIN RATE

Herman L. LaNieve, Summit, N.J., assignor to Celanese Corporation, New York, N.Y.

Division of Ser. No. 387,407, Aug. 10, 1973, Pat. No. 3,925,525. This application July 8, 1975, Ser. No. 594,010

Int. Cl.² D01D *3/00*

U.S. Cl. 425—455 F **13 Claims**



1. In apparatus for spinning filaments from fiber-forming, liquid polymeric material which apparatus includes a spinneret for extending said material through at least one converging nozzle passagway having an entry opening, and an exit orifice with a cross-sectional area in the range of about 3×10^{-6} to 50×10^{-4} square centimeters, the improvement wherein said nozzle passageway is bounded by gradually curving walls having a profile shaped to provide an essentially constant extensional strain rate on liquid polymeric material extruded therethrough to form a filament solely of that material, said profile being described essentially by the equation

$$\frac{1}{r_w^2} = AZ + \frac{1}{R^2}$$

where:

R is the perpendicular distance between an axis of the passageway axis and the nozzle wall at the exit orifice;

r_w is the perpendicular distance between nozzle wall and point along that axis;

Z is the distance along that axis measured from said exit orifice; and

A is a constant.

4,015,925

EXTRUSION EQUIPMENT AND ESPECIALLY DIE STRUCTURE FOR MAKING PLASTIC SIDING

Peter F. Heilmayr, McPherson, Kans., assignor to Certain-teed Products Corporation, Valley Forge, Pa.

Continuation of Ser. No. 225,348, Feb. 10, 1972, abandoned, which is a continuation of Ser. No. 2,900, Jan. 14, 1970, abandoned. This application Oct. 17, 1973, Ser. No. 407,314

Int. Cl.² B29F *3/04*

U.S. Cl. 425—461 **3 Claims**

1. A die structure for producing a siding of a thermoplastic material having a hanger edge portion, a panel portion, and a butt edge portion, said die structure comprising

a. an adapter section having an entry passageway therein connecting to the discharge outlet of an extruder unit,

b. a restriction section downstream of said adapter section having a restriction passage therein,

c. a transition section between said adapter section and said restriction section having a transition passage connecting said entry passage and said restriction passage,

d. a die lip section downstream of said restriction section having a lip orifice substantially conforming to the shape of the siding produced, the die lip section being maintained at the same cross-sectional shape for a distance in the flow channel upstream of the orifice equal to 10 to 30 times the thickness of the siding produced,

e. and a flow equalization section between said restriction section and said die lip section having a flow equalization passage connecting said restriction passage and said lip orifice,

f. all of said passages being interconnected in sequence and being unobstructed to thereby provide an uninterrupted flow channel from the discharge outlet of the extruder unit with which the entry passageway is connected to the die lip orifice, whereby the flow of the thermoplastic material throughout the length of said uninterrupted flow channel and out of the die lip orifice is adapted to be established and maintained by the action of the extruder unit with which the die structure is used.

4,015,926

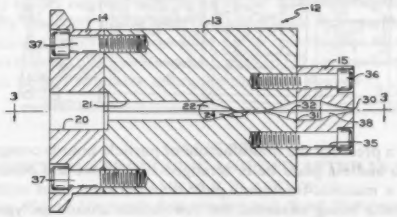
MULTIPLE STRAND DIE HEAD

Sam Donald Nehmey, Lorain, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Jan. 20, 1976, Ser. No. 650,807

Int. Cl.² B29F *3/04*

U.S. Cl. 425—464 **4 Claims**



1. An extrusion die head for use with an extruder, one end of said die head having a longitudinally extending bore extending thereinto for receiving extrudate from an extruder, said die head having an elongated chamber with an opening centrally disposed therein, said opening communicating with said bore, the other end of said die head having a plurality of outlet orifices for directing a plurality of extrudates therefrom, each orifice is connected to a passageway that extends rearwardly from said other end of said die head, said passageways increasing in cross-sectional dimension as said passageway extends further away from said other end, said passageway increases in cross-sectional dimension until they form a single passageway

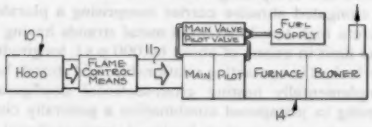
that in interconnected with an elongated recess that extends laterally across the width of said die head, an elongated narrow channel in said die head disposed in alignment with said recess and extending laterally across the width of said die head, said narrow channel interconnecting said recess with said chamber, said chamber extends laterally across the full width of said die head and in alignment with said narrow channel and being of the same width as said channel, and said chamber across the full width of said die head tapers substantially uniformily from said full width to said narrow channel.

4,015,927

AUTOMATIC HIGH-LOW BURNER OPERATION

Clifford Culpepper, Jr., Charlotte, N.C., assignor to Aero-Dyne Manufacturing, Inc., Charlotte, N.C.

Division of Ser. No. 413,770, Nov. 8, 1973, Pat. No. 3,932,137.
This application Jan. 12, 1976, Ser. No. 648,152
Int. Cl.² F23D *13/20*
U.S. Cl. 431—5 **5 Claims**



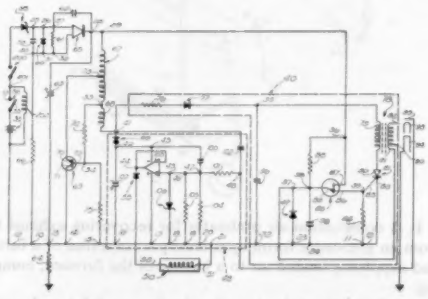
1. In a method for disposing of combustible debris wherein debris is entrained in a flowing stream of air, conveyed with the air through duct work, delivered with the air and fuel to a combustion chamber and burned in the combustion chamber, an improvement which facilitates economical operation in disposing of intermittently varying quantities of debris and comprising the steps of sensing the presence in the flowing stream of air of entrained debris being conveyed through the duct work, distinguishing between second concentrations of entrained conveyed debris being above and below a threshold concentration, and responding to the distinguishing of concentrations by varying the quantity of fuel delivered to the combustion chamber whereby the fuel required to dispose of debris is delivered only as needed and excessive fuel usage is avoided during periods when the concentration of debris is below the threshold concentration.

4,015,928

HEATING SYSTEM

Elmer A. Carlson, Agoura, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Jan. 23, 1976, Ser. No. 651,635
Int. Cl.² F23N *5/00*, *5/24*
U.S. Cl. 431—74 **4 Claims**



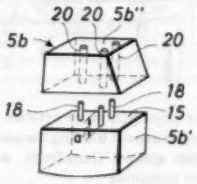
1. A heating system comprising: first and second main input leads; first means for impressing a D.C. voltage between said main input leads; a transformer having first and second inductive windings, each having first and second ends, said first inductive winding having a tap, said first inductive winding first end being connected to said first main input lead, said first inductive winding second end being connected to said second inductive winding first end at a first junction; a first transistor having a base, an emitter and a collector; a first resistor connected between said first junction and said base, said emitter being connected to said tap, said collector being connected to said second main input lead; a second resistor connected between said base and said second main input lead; a first capacitor connected between said first and second main input leads; a conductive fluid fuel burner connected to said second main input lead; a fuel valve actuable to admit fuel to said burner; second means connected between said second inductive winding second end and said second main input lead actuable when said voltage is impressed as aforesaid to actuate said valve; and third means actuable when said voltage is impressed as aforesaid to ignite the fuel emanating from said burner.

4,015,929

ROTARY KILN FOR PRODUCING AN EXPANDED CLAY PRODUCT AND A METHOD OF MANUFACTURING THE ROTARY KILN

Harry Kamstrup-Larsen, Vanlose, Denmark, assignor to Leca Trading & Concession A/S, Denmark

Filed Dec. 15, 1975, Ser. No. 640,927
Claims priority, application Denmark, Jan. 23, 1975, 214/75
Int. Cl.² F27B *7/14*
U.S. Cl. 432—3 **10 Claims**



1. In a rotary kiln for producing an expanded clay product from clay or clay slate, comprising a firing section, the peripheral speed of which is rather great, a drying section positioned downstream from the firing section, the peripheral speed of which is rather low, and ribs formed from refractory bricks mounted in said firing section and protruding radially relative to the lining so as to move the clay product, at least a part of each refractory brick forming said ribs being reinforced, said bricks forming said ribs having first and second portions, said first portion forming at least part of the lining within said kiln and having an interior surface facing the interior of said kiln, said interior surface being at the same height as the lining measured in a radial direction, said second portion extending inwardly away from the interior surface of said first portion and means for reinforcing said first and second portions and for securing said second portion to said first portion so that said second portion is in contact with the interior surface on said first portion.

10. A method of manufacturing a rotary kiln for producing an expanded clay product from clay or clay slate, said kiln having a firing section the peripheral speed of which is rather great, a drying section positioned downstream from the firing section the peripheral speed of which is rather low, and ribs formed from refractory bricks mounted in the firing section for moving the clay product, said method including the steps of: forming a first series of reinforced refractory bricks so that reinforcing members extend away from one surface of said bricks; mounting the reinforced first series of refractory bricks at predetermined locations within the kiln so that the first series of bricks forms at least part of the lining of the kiln and

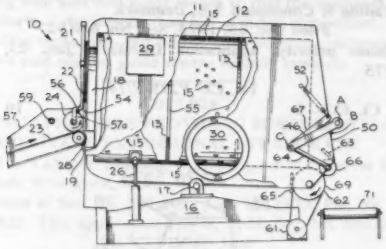
the surface from which the reinforcing members extend faces the center line of the kiln; forming a second series of refractory bricks having through holes corresponding in number and location to the number and position of reinforcing members extending from bricks in said first series, mounting said second series of refractory bricks on the reinforced first series of refractory bricks so that said reinforcing members mesh with and extend at least part way into the holes provided in bricks comprising said second series of bricks, securing the second series of bricks to the reinforcing members extending away from the first series of reinforcing bricks so that bricks within said second series of refractory bricks can be replaced in a like manner when worn down to the level of the reinforcing members.

4,015,930

CONTINUOUS LAUNDRY DRYING APPARATUS

Frederick W. Grantham, 12055 Goshen Ave., Los Angeles, Calif. 90049

Filed Sept. 4, 1975, Ser. No. 610,167
Int. Cl.² F26B *11/02*
U.S. Cl. 432—105 **5 Claims**



1. Apparatus for drying laundry articles comprising:

a housing having an article loading means and a dried article ejection means spaced therefrom, wherein the article loading means comprise:

a. an inlet opening in said housing for receiving batch loads;

b. a closure mechanism movable over said inlet opening and responsive to gravity to move to a closed position;

c. a conveyor external to said housing and positioned to feed articles to said inlet opening;

d. first means adjacent the conveyor and responsive to articles thereon of a first selected size to open mechanically and automatically said closure mechanism by an amount related to the size to the article; and

e. second means adjacent the conveyor and responsive to articles thereon of a second selected size larger than said first size to open mechanically and automatically said closure mechanism for a predetermined time interval;

the apparatus further comprising:

a single rotary drum having an article input portion adjacent to said article loading means and an article exit opening at its opposite end and in communication with said dried article ejection means;

an air inlet opening into an article input portion of the drum, and air outlet means for receiving air from the drum and for imparting an axial component to the air flow toward the dried article ejection means in the direction of movement of laundry articles toward the ejection means;

air conduit means mounted externally of said housing having portions in alignment with said air inlet opening and said air outlet means respectively;

an air heating means and an air blower means mounted in said air conduit means; and

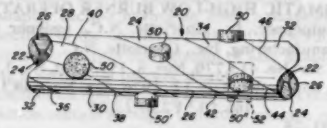
annular partition means having a central opening and extending radially interiorly from an internal periphery of the rotary drum walls to divide the drum into a plurality of sections.

4,015,931

BONDED-ABRASIVE WIRE SAW

Babu N. Thakur, Schaumburg, Ill., assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Filed Sept. 29, 1975, Ser. No. 617,853
Int. Cl.² B28D *1/08*
U.S. Cl. 125—21 **24 Claims**



1. A wire saw comprising in combination:

a. an elongated abrasive carrier comprising a plurality of discrete high tensile strength metal strands having a fatigue limit in excess of about 60,000 p.s.i. longitudinally interlocked in contacting relationship, said strands having complementally nesting cross-sectional configurations forming in juxtaposed combination a generally circular transverse cross section having a cross-sectional void space of less than about 20 percent, the largest cross-sectional dimension of each of said strands being no more than about one half the largest cross-sectional dimension of said abrasive carrier; and

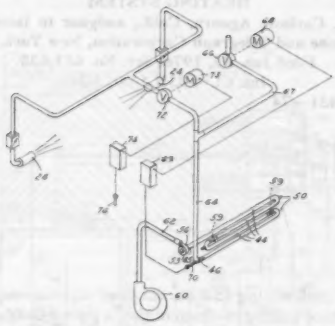
b. circumferentially-discontinuous discrete segments of bonded abrasive particles fixedly secured adjacent the outer periphery of the elongated abrasive carrier and longitudinally disposed spacedly therealong whereby to abrade a workpiece when said wire saw is brought into abrading contact therewith.

4,015,932

COMBUSTION AIR PREHEATER

Daniel A. Zurawski, 4128 Graceway Drive, Toledo, Ohio 43606

Filed Jan. 30, 1975, Ser. No. 545,527
Int. Cl.² F27D *17/00*
U.S. Cl. 432—179 **13 Claims**



1. A combustion air preheater for recovering exhaust heat from an enclosure forming at least part of a flue of a furnace and supplying heated air to a burner of the furnace, comprising:

a cylindrical preheater pipe having an inlet end and an outlet end,

means for mounting the preheater pipe in said enclosure with the inlet and outlet ends of the pipe located externally of the enclosure,

air inlet means connected to the inlet end of the preheater pipe for introducing air thereto in a direction generally transverse and tangential to the longitudinal axis thereof, said air inlet means comprising a housing having an outlet opening connected to the inlet end of the preheater pipe and aligned axially therewith, said housing having an inlet opening directed transversely to the axis of the outlet opening and spaced radially outward of said axis, and a generally cylindrical baffle defining an annular passage communicating tangentially with the inlet opening and axially with the outlet opening;

an air passage connecting the outlet end of the preheater pipe to the burner,

and control means operatively associated with said air passage for regulating at least one physical property of air supplied to the burner through said air passage.

generally cylindrical baffle defining an annular passage communicating tangentially with the inlet opening and axially with the outlet opening,

an air passage connecting the outlet end of the preheater pipe to the burner,

and control means operatively associated with said air passage for regulation of the physical property of air supplied to the burner through said air passage.

[illegible]

[illegible]

an inlet means connected to the inlet end of the preheater pipe for introducing air thereto in a direction generally transverse and tangential to the longitudinal axis thereof, said air inlet means comprising a housing having an outlet opening connected to the inlet end of the preheater pipe and aligned axially therewith, said housing having an inlet opening directed transversely to the axis of the outlet opening and spaced radially outward of said axis, and a

[illegible]

[illegible]

[illegible]

4,015,933
PROCESS FOR DYEING BLENDED FABRICS

Stefan Koller, Ramlinsburg; Arnulf Ruediger Lapple, Arlesheim, and Marielise Pacher, Munchenstein, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

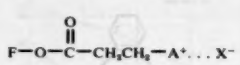
Filed Apr. 24, 1975, Ser. No. 571,343

Claims priority, application Switzerland, Apr. 29, 1974, 5872/74

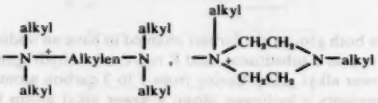
Int. Cl.² D06P *3/82*

U.S. Cl. 8—21 A **16 Claims**

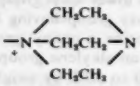
1. A process for dyeing or printing a blend of wool and polyacrylic fibers which comprises the step of applying to the fibers a dye of the formula



wherein A is of the formulas



or



X is an anion and F is the radical of a dye of the disperse class.

4,015,934
PROCESS FOR THE DYEING OF SYNTHETIC TEXTILE MATERIAL

Hans Wilhelm Liechti, Oberwil, and Jurgen Markert, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

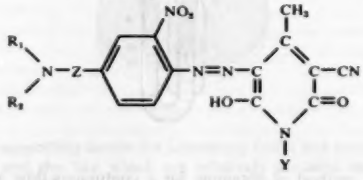
Filed Nov. 12, 1973, Ser. No. 415,282

Claims priority, application Switzerland, Nov. 16, 1972, 16731/72; Nov. 16, 1972, 16730/72

Int. Cl.² D06P *1/18*

U.S. Cl. 8—41 C **13 Claims**

1. A process for dyeing synthetic textile material by the exhaust process, comprising the step of treating the textile material with a dispersion in a halogenated hydrocarbon solvent material of an azopyridone dyestuff of the formula



wherein

R_1 and R_2 each independently represent hydrogen, or an optionally substituted lower alkyl, lower alkenyl, cycloalkyl or aryl radical, or

R_1 and R_2 form together with the nitrogen atom binding them, optionally with the inclusion of a further hetero atom, a non-aromatic 5- or 6-membered hetero ring,

Y represents hydrogen, or a lower alkyl group optionally substituted by the hydroxyl or cyano group, and

Z represents —CO— or —SO_2—.

4,015,935
METHOD AND APPARATUS FOR FEEDING AND DISCHARGING A CONTINUOUSLY OPERATING AUTOCLAVE

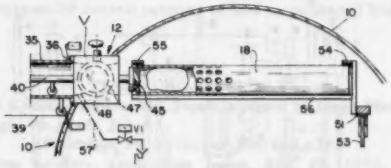
Bror Lennarth Andersson, and Nils Arne Fahlvik, both of Getinge, Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Nov. 21, 1975, Ser. No. 634,252

Claims priority, application Sweden, Dec. 2, 1974, 7415089

Int. Cl.² A23L *3/04*; A61L *1/00, 3/00*

U.S. Cl. 21—2 **7 Claims**



1. In a feed and discharge arrangement for a continuously operating autoclave provided with a heated medium at superatmospheric pressure and an internal conveyor for sterilization of articles carried by perforated containers; the improvement comprising: a feed lock for inserting said perforated containers into said autoclave and onto said internal conveyor, a discharge lock for withdrawing said perforated containers having treated articles therein from said autoclave, each of said locks being provided with a valve which in its open position has an aperture that is larger than the diameter of each of said perforated containers, each of said locks including at least two interfitting telescoping cylinders one of which is adapted to contain a perforated container and is provided with a front end creating a front sealing surface when abutting a part of said lock whereby the forward part of said one cylinder forms a locking chamber, a first means in the locking chamber of said feed lock for pushing said container therein through said valve and onto said internal conveyor, and a second means in the locking chamber of said discharge lock for discharging said container from said internal conveyor through said discharge lock valve and into the locking chamber of said discharge lock after said container has been transported to a position adjacent to said discharge lock.

7. A method for respectively feeding and discharging articles into an autoclave and onto an internal continuous conveyor in a heated liquid bath at superatmospheric pressure for sterilization comprising:

a. placing articles to be processed in perforated containers,

b. arranging said containers in aligned rows at a feed station leading into said autoclave,

c. passing said containers through a feed lock at a feed station and into said autoclave and onto said continuous conveyor, and wherein said feed lock comprises a plurality of telescoping interfitting cylinders in which a forward part of one cylinder forms a locking chamber, and a valve, and a piston in said locking chamber, the method of passing said containers through a feed lock including the steps of:

1. advancing the one cylinder to seal with the valve thereby forming said locking chamber and enclosing a perforated container within said locking chamber,
2. opening the valve,
3. advancing the piston so that the perforated container is moved through the feed lock and onto the conveyor in the autoclave,
4. retracting the piston to a return position,
5. closing the valve,
6. equalizing the pressure between the locking chamber and the ambient by means of a conduit having a valve therein and connected to the feed lock, and
7. returning the one cylinder to its initial position,

d. treating said articles in said liquid bath, and

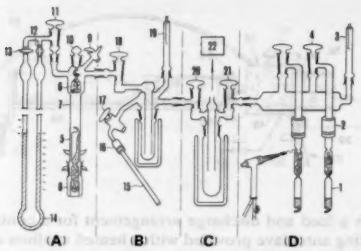
e. discharging said treated articles through a discharge lock at a discharge station.

4,015,936

METHOD FOR DETERMINATION OF TOTAL NITROGEN AND HEAVY NITROGEN CONTENT

Kikuo Kumazawa, Tokyo, Japan, assignor to Hiryokagaku Kenkyusho, Tokyo, Japan

Filed Aug. 26, 1975, Ser. No. 607,799
Int. Cl.² G01N 7/02, 7/18
U.S. Cl. 23—230 PC **1 Claim**



1. A method for determining the total nitrogen content of a given specimen, said method comprising:

sealing the specimen together with calcium oxide and copper oxide in a container;

heating the sealed container to a temperature sufficient to cause the specimen to undergo combustion and generate nitrogen;

opening the sealed container in an evacuated environment to release the generated nitrogen;

measuring the volume and pressure of the nitrogen thus released.

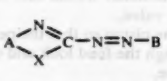
4,015,937

PROCESS FOR DETECTING THE COMPLETION OF THE STERILIZING TREATMENT USING A COLOR CHANGING INDICATOR COMPOSITION

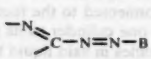
Kozo Miyamoto, and Kunitaka Fujiwara, both of Toyonaka, Japan, assignors to Sakata Shokai Ltd., Osaka, Japan

Filed Nov. 14, 1975, Ser. No. 631,904
Int. Cl.² G01N 21/06; C09B 29/00
U.S. Cl. 23—230 R **20 Claims**

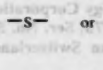
1. A process for detecting the completion of a sterilizing treatment of a medical or a surgical instrument in which a gaseous alkylene oxide is the sterilizing agent, which comprises exposing to said alkylene oxide the material to be sterilized and a color changing indicator composition, which indicator composition visibly exhibits a color change when exposed to said alkylene oxide, and maintaining said alkylene oxide in contact with said material and said indicator composition at least until said color change occurs in said indicator composition, said color changing indicator composition comprising from 1 to 5% by weight of an azo dye represented by the following formula



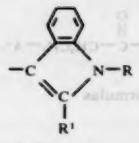
wherein A represents an ethylene residual group, an o-phenylene residual group, or



with proviso that —N is linked with X, while —C with N in the formula (1), respectively, which is further enabled to have an undissociative group as a substituent; X represents



B represents an aniline-derivative residual group which can be coupled to the para-position or an enamine residual group having the formula,



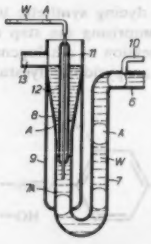
and the both groups are further enabled to have an undissociative group as a substituent, said R represents a hydrogen atom or a lower alkyl group having from 1 to 3 carbon atoms, said R^1 represents a hydrogen atom, a lower alkyl group having from 1 to 3 carbon atoms or a phenyl group, said undissociative group represents a lower alkyl group having from 1 to 3 carbon atoms, an alkoxy group having from 1 to 3 carbon atoms, —R^2—OH, chlorine, a phenyl group or a nitro group, wherein R^2 represents an alkylene group having from 1 to 3 carbon atoms, from 10 to 50% by weight of a hydrophobic polymer and from 30 to 85% by weight of a solvent or mixed solvent.

4,015,938

SAMPLE SUPPLY APPARATUS AND METHOD FOR AUTOMATIC ANALYSIS SYSTEMS

Ronald Frank Jay, New Malden, England, assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Nov. 18, 1975, Ser. No. 633,059
Int. Cl.² G01N 1/14, 1/18
U.S. Cl. 23—230 R **13 Claims**



8. A method of obtaining for a continuous-flow analysis system a stream *of successive liquid segments separated by immiscible fluid segments*, comprising the steps of:

flowing a *stream of liquid separated by immiscible fluid segments* along a conduit toward an outlet thereof;

intermittently positioning an inlet portion of a tube *within said conduit and* in fluid-flow communication with said stream; and

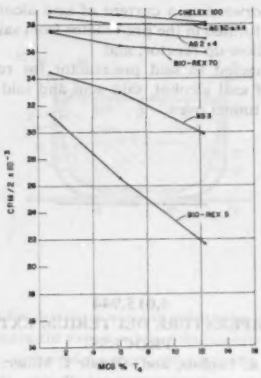
aspirating through said tube a portion of said *successive liquid and immiscible fluid segments, in turn,* when said inlet portion is *positioned within said conduit.*

4,015,939

COMPETITIVE BINDING THYROID ASSAY WITH IMPROVED BOUND-FREE SEPARATION STEP

Nathan Lewin, Corte Madera, and Vito J. Mangiardi, San Rafael, both of Calif., assignors to Bio-Rad Laboratories, Inc., Richmond, Calif.

Filed May 12, 1976, Ser. No. 685,595
Int. Cl.² G01N 33/16
U.S. Cl. 23—230 B 10 Claims



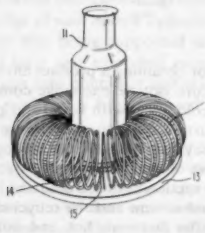
1. In a competitive binding assay for serum thyroid hormone having the step of separating unbound thyroid hormone from thyroid hormone bound by thyroid binding protein, the improvement comprising: separating unbound thyroid hormone by removal with an intermediate base anion exchange resin.

4,015,940

HOLDING DEVICE FOR LABORATORY WARE

Daniel R. Conlon, 600 Meetinghouse Road, Jenkintown, Pa. 19046

Filed Apr. 28, 1976, Ser. No. 680,990
Int. Cl.² B01L 9/00, 3/00
U.S. Cl. 23—259 2 Claims



1. A supporting device for laboratory flasks and containers, bottles and the like which are relatively unstable on a flat surface which comprises a helical spring joined at its ends to form a torus-shaped body with several turns of said spring being loosely affixed to a base, thereby permitting expansion of said torus-shaped body when an object having a dimension greater than the central opening of the torus is inserted therein, wherein said helical spring is constructed of a thin wire having a rectangular cross-section with its long side directed radially relative to the helix and is wound to have no compression or tension between turns, and wherein the natural frequency of said spring is between 10 and 100 cycles per minute.

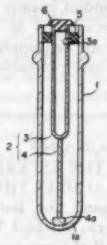
2. In combination, a laboratory container which is relatively unstable on a flat surface and a supporting device for said laboratory container surrounding and in contact with said container and holding it in a fixed position, said supporting device comprising a helical spring joined at its ends to form a torus-shaped body with several turns of said spring being loosely affixed to a base, said helical spring being constructed of a thin wire having a rectangular cross-section with its long side directed radially relative to the helix and being wound to have no compression or tension between turns, said helical spring having a natural frequency of between 10 and 100 cycles per minute, said container having a dimension, at its location of contact with said torus-shaped body, greater than the unexpanded central opening of said torus-shaped body.

4,015,941

TEST TUBE ASSEMBLY

Motoji Kurata, Hatsukaichi, Japan, assignor to Japan Medical Supply Co., Ltd., Japan

Filed Jan. 29, 1976, Ser. No. 653,631
Claims priority, application Japan, Jan. 29, 1975, 50-012443[U]
Int. Cl.² B01L 3/14; G01N 1/10
U.S. Cl. 23—259 4 Claims



1. A test tube assembly adapted to be used for blood testing said assembly comprising:
a cylindrical holding member;
a test tube disposed in said cylindrical holding member;
a leg connected to the bottom of said test tube for supporting said test tube within said holding member, said leg having a foot at one end thereof for stabilizing it within said cylindrical holding member, wherein the sum of the lengths of said test tube and said leg is equal to that of said cylindrical holding member; and
means for holding said test tube within said cylindrical holding member for eliminating lateral movement of said test tube.

4,015,942

APPARATUS FOR DELIVERING LIQUID AND REMOVING LIQUID FROM A CONTAINER

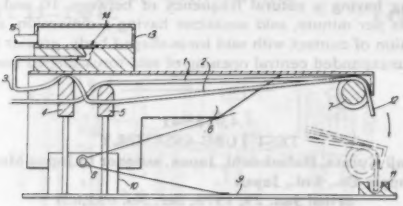
Neville Burton Coupe, Billingshurst, England, assignor to Denley-Tech Limited, Sussex, England

Filed Dec. 5, 1975, Ser. No. 638,099
Claims priority, application United Kingdom, Dec. 10, 1974, 53431/74
Int. Cl.² B01L 11/00; B67C 3/28; F16L 55/14
U.S. Cl. 23—259 10 Claims

1. Apparatus for use in the delivery of liquid to and the withdrawal of material from containers comprising:
at least a first pair of conduit means, said conduit means of said pair of each including a constrictible tubular portion, a first of said conduit means of said pair having a free end for delivery of liquid to a container and the second of said conduit means having a free end for withdrawal of material from the container by suction;
pivotable support means for said conduit means, said sup-

port means mounting said conduit means such that the free ends thereof may be simultaneously moved relative to the container between a first position and a second position;

first abutment means, said first abutment means being fixedly mounted relative to said support means for compressing said second conduit means constrictible portion when said support means is in the first position whereby material may not be withdrawn through said second con-



duit means when said pivotable support means is in the first position; and

second abutment means, said second abutment means being fixedly mounted relative to said support means for compressing said first conduit means constrictible portion when said support means is in the second position whereby liquid may not be supplied through said first conduit means when said pivotable support means is in the second position.

4,015,943

APPARATUS FOR THE ESTERIFICATION OF TEREPHTHALIC ACID IN THE GAS PHASE

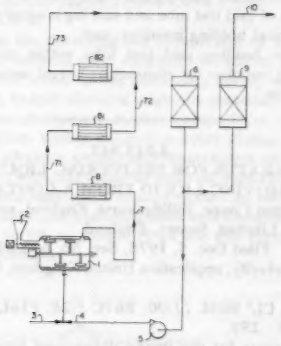
Horst-Dieter Wulf; Ferdinand List, both of Marl; Friedrich-August Orlowski, Haltern; Norbert Wilke, and Emmerich Pflegerl, both of Marl, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Division of Ser. No. 420,307, Nov. 29, 1973, Pat. No. 3,972,912. This application Apr. 21, 1976, Ser. No. 679,046

Claims priority, application Germany, Dec. 15, 1972, 2261333

Int. Cl.² B01J *8/04;* **C07C** *69/76*

U.S. Cl. 23—262 **1 Claim**



1. An apparatus for the esterification of a normally solid organic acid in the solid state with normally liquid alcohol in the gaseous or vapor state, to an ester in the presence of a granular solid esterification catalyst, which consists essentially of a rotatable tunnel oven;

means for heating said tunnel oven;

means for feeding said organic acid in the solid state into one end of said oven;

means for feeding said alcohol into said one end of said oven;

means for discharging a gaseous current of alcohol and said acid from the other end of said oven;

an esterification pre-reactor having a fixed bed catalyst;

means for forwarding the gaseous current of alcohol and said acid from said means for discharging to said pre-reactor, said fowarding means comprising conduit means and heat exchanger means;

a follow-up esterification reactor having a fixed bed catalyst;

means for forwarding a current of said alcohol, said acid and ester formed in the pre-reactor from said pre-reactor to said follow-up reactor; and

means connected to said pre-reactor for recirculating a portion of said alcohol, said acid and said ester to said rotatable tunnel oven.

4,015,944

DUAL TEMPERATURE DEUTERIUM EXTRACTION PROCESS

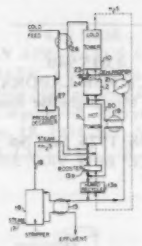
Gerard J. C. A. Pauluis, and Alistair I. Miller, both of Deep River, Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Dec. 18, 1974, Ser. No. 533,768

Claims priority, application Canada, Mar. 19, 1974, 195387

Int. Cl.² C01D *11/00;* **C01B** *5/02*

U.S. Cl. 23—270.5 W **5 Claims**



1. Apparatus for obtaining a product enriched in deuterium by dual temperature isotope exchange comprising:

a. a hot and a cold tower with liquid and gas streams passing in countercurrent deuterium exchange relation therein,

b. means for recycling the gas from the top of the cold tower to the bottom of the hot tower,

c. a humidifier section between cold and hot towers through which a liquid stream and the recycled gas passes,

d. a dehumidifier between hot and cold towers through which the gas and liquid streams pass,

e. means for heat exchange between humidifier and dehumidifier,

f. a cold liquid feed inlet to the apparatus,

g. a heat exchanger for heating the cold liquid feed,

h. means for applying said heated liquid to the system at the top of the humidifier section at a point between the liquid outlet of the hot tower and the liquid input to the humidifier,

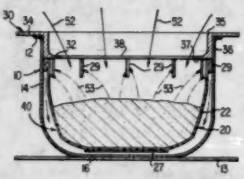
i. means for recycling a portion of the liquid leaving the hot tower to the top of the cold tower via the said heat exchanger, and

j. means for taking a product enriched in deuterium from the system.

4,015,945
DEVICE FOR MIXING BONE CEMENT

S. Arthur Frankel, Billings, Mont.; George E. McGuire, De Pere, Wis., and Robert O. Wuthrich, Indianapolis, Ind., assignors to Zimmer, U.S.A. Inc., Warsaw, Ind.

Filed Mar. 15, 1976, Ser. No. 666,728
Int. Cl.² B01L 3/00
U.S. Cl. 23—292 3 Claims



1. A device for mixing a volatile substance which emits an obnoxious or harmful vapor, while simultaneously preventing said obnoxious or harmful vapor from escaping into the ambient atmosphere, said device comprising,

A. a bowl-shaped container having an open upper end and an exhaust port in the side wall of said container;

B. means for connecting said container to a low pressure source, said means associated with said exhaust port;

C. a replaceable, resilient bowl-shaped plastic liner having an open upper end, said liner fitting entirely within said container; means associated with said liner for spacing the walls of said liner away from the walls of said container, said space defining a fluid passageway; a plurality of exhaust openings uniformly spaced at the upper end of said liner, the interior of said liner being in fluid flow communication with said fluid passageway through said exhaust openings; and,

D. a deflector cap having

1. a hollow cylindrical member which is adapted to be slideably positioned within said container,

2. a first flat annular disc extending radially inwardly from the lower edge of said hollow cylindrical member, said first annular disc being supported at the open upper end of said liner and extending over and closing the space between said container and said liner when said cylindrical member is fully inserted within said container, and

3. a second flat annular disc extending radially outwardly from the upper edge of said cylindrical member, and said second annular disc being supported at the open upper end of said container when said cylindrical member is fully inserted within said container, said first annular disc defining an access opening into said liner sufficiently large to permit entry of a human hand, the diameter of said access opening being less than the inside diameter of the upper end of said liner, said first annular disc thereby functioning to deflect the ambient atmosphere into the interior and toward the center of said liner when said means (B) is connected to a low pressure source,

whereby when a volatile substance is being mixed in said liner the obnoxious or harmful vapor admixed with ambient air will be drawn out of said liner through said exhaust opening into said fluid passageway and out of said device through said exhaust port.

4,015,946
PROCESS FOR RECOVERING AMMONIUM SULPHATE FROM AQUEOUS SOLUTIONS OF AMMONIUM SULPHATE WHICH CONTAIN ORGANIC COMPOUNDS

Jentje Bonnema, Beek, and Henri J. H. Simon, Geleen, both of Netherlands, assignors to Stamicarbon N.V., Geleen, Netherlands

Continuation of Ser. No. 798,155, Feb. 10, 1969, abandoned. This application July 12, 1971, Ser. No. 161,997
Claims priority, application Netherlands, Feb. 8, 1968, 6801824
Int. Cl.² B01D 9/02; C01C 1/24
U.S. Cl. 23—300 3 Claims

1. In a process for recovering purified ammonium sulphate from a contaminated aqueous ammonium sulfate solution containing at least 30 percent by weight ammonium sulfate and organic impurities soluble in a water-soluble organic substance, said aqueous solution obtained from

the synthesis of acrylonitrile prepared by oxidation of gaseous propylene in the presence of ammonia, wherein the reaction product is treated with sulfuric acid and then separated from the resulting ammonium sulfate solution;

the synthesis of methyl methacrylate prepared from acetone cyanohydrin, methanol, and sulfuric acid; or

the synthesis of methyl acrylate prepared from acrylonitrile, methanol, and sulfuric acid,

the improvement which comprises intimately contacting said aqueous solution of ammonium sulfate containing said organic impurities with an organic substance selected from the group consisting of lactams of 4 to 20 carbon atoms and mixtures thereof, said organic substance being present in an amount sufficient to form an organic phase and an aqueous phase during crystallization, crystallizing said aqueous solution containing ammonium sulfate, organic contaminants, and lactams of 4 to 20 carbon atoms by evaporation, whereby a two-phase liquid system containing a substantially saturated aqueous ammonium sulfate-containing phase and a lactam-containing phase and solid ammonium sulfate crystals are formed,

maintaining said phases in a liquid state so as to extract said organic impurities from the aqueous phase by means of the organic substance and separating the phases.

4,015,947
PRODUCTION OF SINTERED ALUMINUM ALLOY ARTICLES FROM PARTICULATE PREMIXES

Edul M. Daver, Westfield, N.J., assignor to Alcan Aluminum Corporation, Cleveland, Ohio

Filed Sept. 10, 1975, Ser. No. 611,888
Int. Cl.² B22F 3/00; C23C 1/04
U.S. Cl. 75—201 20 Claims

1. A method of producing a sintered metal article comprising:

a. intimately mixing a major proportion of an aluminum premix powder with a minor proportion of particles of an alloy, of a metal selected from the class consisting of cobalt and nickel, having a hard intermetallic Laves phase present in a matrix softer than the Laves phase, said minor proportion being effective to impart wear resistance to the produced article; and

b. sintering the resultant mixture at a temperature for effecting controlled diffusion of said particles such that the particles are strongly bonded to metal of the premix powder while remaining as discrete hard cores distributed through the sintered article, thereby to produce a structurally integral, wear-resistant article.

7. A method of producing a sintered metal article comprising:

a. intimately mixing

i. a major proportion of an aluminum premix powder containing a major proportion of aluminum and a minor proportion of magensium with

ii. a minor proportion of particles of an alloy, of a metal

selected from the class consisting of cobalt and nickel and containing molybdenum and silicon as principal alloying elements, having a hard intermetallic Laves phase present in a proportion of at least about 30% by volume in a matrix softer than said Laves phase, said minor proportion of particles being between about 5 and about 25% by volume of the resultant mixture of premix powder and said particles of said alloy; and

b. sintering the resultant mixture at a temperature between about 530° and about 590° C for producing a strong, structurally integral, wear-resistant article by effecting controlled diffusion of said particles such that the particles are bonded to metal of the premix powder while remaining as discrete hard cores distributed through the sintered article.

16. A method of producing a sintered metal article comprising:

a. establishing an intimate mixture consisting essentially of

i. about 75 to about 95% by volume of an aluminum premix powder comprising at least about 90% by weight Al and about 0.5 to about 2.5% by weight Mg, and

ii. about 5 to about 25% by volume of particles of an alloy consisting essentially of about 50 to about 62% by weight of a metal selected from the class consisting of Co and Ni, about 28 to about 35% by weight Mo, about 2 to about 10% by weight Si, up to about 17% by weight Cr, and having a hard intermetallic Laves phase present in a proportion of about 30 to about 65% by volume in a matrix softer than the Laves phase;

b. compacting said mixture; and

c. sintering the compacted mixture for about 15 to about 60 minutes at a temperature between about 530° and about 590° C for producing a strong, structurally integral, wear-resistant article by effecting controlled diffusion of said particles such that the particles are bonded to metal of the premix powder while remaining as discrete hard cores distributed through the sintered article.

18. A method of producing a sintered metal article, comprising:

a. mixing, with a major proportion of metal powder consisting essentially of aluminum, a minor proportion of particles of an alloy consisting essentially of about 50 to about 62% by weight of a metal selected from the class consisting of Co and Ni, about 28 to about 35% by weight Mo, about 2 to about 10% Si, up to about 17% by weight Cr, and having a hard intermetallic Laves phase present in a proportion of about 30 to about 65% by volume in a matrix softer than the Laves phase, said minor proportion being effective to impart wear resistance to the produced article;

b. compacting the resultant mixture; and

c. sintering the compacted mixture at a temperature of about 625° C for producing a structurally integral, wear-resistant article by effecting controlled diffusion of said particles such that the particles are bonded to metal of the premix powder while remaining as discrete hard cores distributed through the sintered article.

4,015,948

COPPER-BASE SOLDER

Masatoshi Tsuda, No. 6, Minamiichi-iocho Taishogun, Kita, Kyota, Japan

Continuation-in-part of Ser. No. 430,708, Jan. 4, 1974, abandoned. This application Aug. 6, 1975, Ser. No. 602,532

Int. Cl.² C22C *9/05*

U.S. Cl. 75—157.5 **3 Claims**

1. A shock absorbing copper-manganese-zinc solder consisting essentially of from 60 percent to 64 percent of copper, from 30 percent to 34 percent of manganese, from 2 percent to 10 percent of zinc, and from 0.05 percent to 0.5 percent of titanium, said solder having a melting point range of from 847° C. to 865° C., a wettability range of from 0.49 to 0.81 mm^2/mg, and a hardness of 120 to 126 (Hmv) 100 gr.

4,015,949

PLAIN BEARINGS

Dennis Stanley Baker, High Wycombe, and Glyndwr John Davies, London, both of England, assignors to The Glacier Metal Company Limited, Middlesex, England

Continuation of Ser. No. 402,334, Oct. 1, 1973, abandoned. This application Oct. 8, 1975, Ser. No. 620,754

Claims priority, application United Kingdom, June 13, 1973, 28054/73; July 4, 1973, 31969/73; Aug. 30, 1973, 40801/73

Int. Cl.² B32B *15/08*

U.S. Cl. 428—653 **2 Claims**

1. A bearing comprising a steel backing having an aluminum containing layer bond ed to it, and a lining of polyphenylene sulphide adherent to said aluminum containing layer.

4,015,950

SURFACE TREATMENT PROCESS FOR STEELS AND ARTICLE

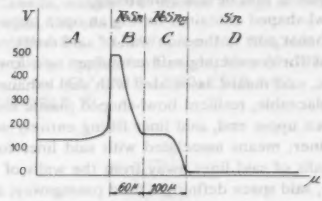
Jacques Galland; Dominique Boutard nee Gabillet, both of Antony, and Jacques Chêne, Paris, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Siene, France

Filed Aug. 1, 1975, Ser. No. 601,045

Claims priority, application France, Aug. 14, 1974, 74.2829

Int. Cl.² C23C *1/04*

U.S. Cl. 428—648 **34 Claims**



1. A method of providing a hard and corrosion resistant layer comprising iron and tin on a surface of a steel substrate which comprises: immersing a surface of a steel substrate in a bath of molten tin maintained at a temperature of from 400° to 700° C for a period of time sufficient to cause a tin-containing layer containing diffused iron to adhere to said surface, said tin-containing layer comprising a first, inner, portion adjacent the steel substrate containing iron and tin in amounts corresponding substantially to the formula FeSn, a second portion adjacent said first portion containing iron and steel in amounts corresponding substantially to the formula $FeSn_2$, and a third, outer, portion of tin adjacent said second portion; removing said surface bearing said tin-containing layer from said bath; and removing said third portion and said second portion of said tin-containing layer to provide said surface of said steel substrate with a hard and corrosion resistant layer containing iron and tin in amounts corresponding substantially to the formula FeSn.

4,015,951

FUEL PELLETS AND METHOD FOR MAKING THEM FROM ORGANIC FIBROUS MATERIALS

Rudolf Wilhelm Gunnerman, 535 Haynes Ave., Beverly Hills, Calif. 90210

Filed Jan. 5, 1976, Ser. No. 646,514

Int. Cl.² C10L *5/00*

U.S. Cl. 44—10 E **10 Claims**

1. A process for making fuel pellets from organic fibrous material which comprises adjusting the moisture content of comminuted fibrous material to from 16 to about 28% by weight, compressing the material in a die into a substantially symmetrical shape while at the said moisture content at a

pressure whereby the temperature of the resulting pellet as it emerges from the die is from about 325° to 350° F. and drying the pellets to a moisture content which is approximately in equilibrium with the surrounding atmosphere.

5. A combustible organic fibrous pellet having a substantially symmetrical configuration with a maximum dimension in cross-section of not more than about one-half inch, a density above about 65 pounds per cubic foot and a substantially smooth protective surface coating of natural substances which have exuded from the organic fibrous material adapted to burn substantially uniformly and develop a BTU of from about 8,500 – 9,000 per pound.

4,015,952
LIQUID HYDROCARBON COMPOSITIONS OF IMPROVED BEHAVIOR IN THE COLD AND CONTAINING DIENE POLYMERS

Jean-Pierre Durand, Chatou; Bernard Aubin, Malakoff; Francois Dawans, Bougival, and Gilbert Chapelet, Bron, all of France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, Rueil-Malmaison, France

Filed Nov. 27, 1974, Ser. No. 527,802

Claims priority, application France, Nov. 28, 1973, 73.42470

Int. Cl.² C10L *1/16*

U.S. Cl. 44—80 **12 Claims**

1. A composition comprising a major portion of a petroleum middle distillate and an amount sufficient to improve its filterability in the cold of at least one partially hydrogenated 1,3-butadiene homopolymer having essentially function-free terminal groups, which has:

a. a microstructure, as determined before hydrogenation, of at least about 90% of 1,4-addition units;

b. an average molecular weight by number of 500 to 20,000 and

c. an olefinic unsaturation ratio of 5–80% of the units constituting the polymeric chain.

4,015,953
FIRECHECK

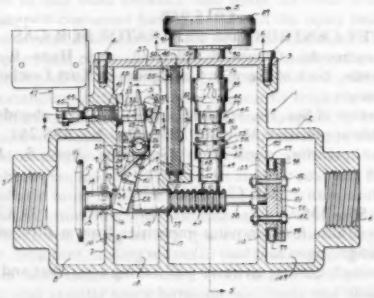
Wallace I. Stenzel, Thiensville; Frederick W. Kufrin, Janesville, and Donald J. Allen, Fort Atkinson, all of Wis., assignors to Waukee Engineering Co., Milwaukee, Wis.

Division of Ser. No. 409,401, Oct. 25, 1973. This application July 7, 1975, Ser. No. 593,781

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² F23D *13/46*

U.S. Cl. 48—192 **9 Claims**



1. A firecheck adapted to be connected in a combustible gas line, comprising a casing having an inlet and an outlet and an access opening, a cover plate to removably enclose the access opening, a burner screen located within the casing between the inlet and the outlet and disposed in communication with said access opening, control valve means disposed within the casing for controlling the flow of gas through the casing and movable between an open position and a closed position, opening means for moving the valve means to the open position, valve closing means for moving the valve means to the closed position, and means responsive to removal of the cover plate from the casing for actuating said valve closing means to move said valve means to the closed position.

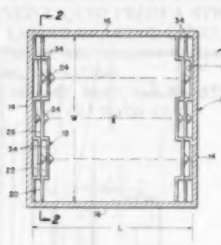
4,015,954
LAMINAR FLOW FLAME ARRESTOR

Robert D. Reed, Tulsa, Okla., assignor to John Zink Company, Tulsa, Okla.

Filed Dec. 29, 1975, Ser. No. 644,595

Int. Cl.² F17D *3/00*

U.S. Cl. 48—192 **6 Claims**



1. A flame arrestor for use in passage-ways for combustible oxidant/fuel mixtures compriseing:

a. a housing of rectangular cross-section of selected values of internal cross-sectional width W and length L, and having a selected height H parallel to the direction of flow of said mixtures;

b. a plurality of substantially identical planar laminae stacked in parallel contiguous contact within said housing along the entire internal length L of said housing;

c. each lamina having a width W and height H and formed with a plurality of spaced-apart, parallel, shallow, rectangular channels, parallel to and extending the length of said height dimension H, said channels of selected depth D and width C, said laminae being so stacked as to form a plurality of substantially equal sized narrows slots for gas flow, said slots of width D and length C for a distance H in the flow direction.

4,015,955
FLUID SEPARATION PROCESS AND MEMBRANE

Edward F. Steigelmann, Naperville, Ill., and Charles S. Sokol, Cincinnati, Ohio, assignors to Standard Oil Company, Chicago, Ill.

Filed Feb. 5, 1975, Ser. No. 547,217

Int. Cl.² C07C *11/12*, *9/00*

U.S. Cl. 55—16 **23 Claims**

1. A membrane-liquid barrier system comprising a semipermeable membrane film and an aqueous liquid barrier in contact with said film, said liquid barrier having dissolved therein a complex-forming cuprous ion component and said barrier being in contact with a reducing agent in an amount sufficient to retard oxidation of said cuprous ion component.

4,015,956

PROCESS AND ARRANGEMENT FOR THE ENRICHMENT OF GASES

Heinrich Münzner, Essen-Kray; Heinrich Heimbach, Bochum; Werner Körbächer, Essen-Borbeck; Werner Peters, Wattenscheid; Harald Juntgen, Essen-Heisingen; Karl Knoblauch, Essen, and Dieter Zündorf, Essen-Heisingen, all of Germany, assignors to Bergwerksverband GmbH, Essen, Germany

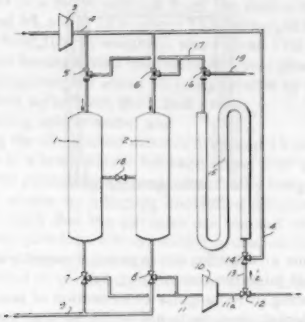
Continuation-in-part of Ser. No. 245,460, April 19, 1972, abandoned, and a continuation-in-part of Ser. No. 161,211, July 9, 1971, Pat. No. 3,801,513. This application Feb. 22, 1974, Ser. No. 445,319

Claims priority, application Germany, Apr. 23, 1971, 2119829; Feb. 16, 1972, 2207117

The portion of the term of this patent subsequent to Mar. 8, 1994, has been disclaimed.

Int. Cl.[2] B01D *15/06*

U.S. Cl. 55—25 25 Claims



1. A process for the oxygen-enrichment of air, comprising initially loading at least one adsorber with oxygen by conveying a stream of air into said one adsorber while evacuating an initial effluent gas from said one adsorber, said one adsorber adsorbing oxygen preferentially to nitrogen, and said initial effluent gas initially having a proportion of oxygen which is less than the proportion of oxygen in said air stream; terminating said initial loading when the proportion of oxygen in said initial effluent gas approximates the proportion of oxygen in said air stream; thereafter additionally loading said one adsorber with oxygen by conveying a nitrogen-containing gas stream having substantially 25 to 40 % by volume of oxygen into said one adsorber while evacuating another effluent gas from said one adsorber, said other effluent gas initially having a proportion of oxygen which at most approximately equals the proportion of oxygen in said air stream; terminating said additional loading before the proportion of oxygen in said other effluent gas substantially exceeds the proportion of oxygen in said air stream; thereafter initially unloading said one adsorber by creating an underpressure therein so as to obtain a first fraction which has substantially 25 to 40 % volume of oxygen; subsequently substantially completely unloading said one adsorber at an underpressure so as to obtain a second fraction which has substantially 40 to 90 % by volume of oxygen; recovering said second fraction as product gas; and using said first fraction in at least one loading step similar to said additional loading step.

4,015,957

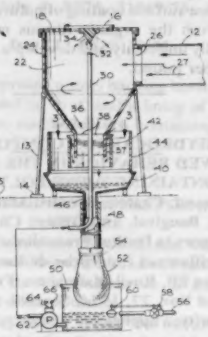
EXTRACTOR FOR AIRBORNE PARTICULATE MATTER

Frederick W. Grantham, 12055 Goshen Ave., Los Angeles, Calif. 90066

Division of Ser. No. 456,057, March 29, 1974, Pat. No. 3,920,425. This application Sept. 12, 1975, Ser. No. 612,651

Int. Cl.[2] B01D *47/16*

U.S. Cl. 55—227 12 Claims



1. Apparatus for extracting airborne particulates, said apparatus including:

a mixing chamber having a first, tangentially disposed upper opening for the introduction of airborne particulates into said chamber in a rotary motion and including means for producing a mixture of a settling liquid and said particulates, the mixing chamber also having a second, lower opening for air and said mixture to flow out through;

a basin positioned below the mixing chamber to collect the mixture of liquid and particulates while allowing the air to escape, the basin having an outlet opening for draining said mixture therefrom;

an air stream straightening chamber of cylindrical cross-section connected to the mixing chamber at the second opening thereof and positioned between the mixing chamber and the basin and including at least one baffle member for terminating the rotary motion of the air stream;

particulate collector means connected to the basin outlet opening to receive the flow of said mixture from the basin for collecting the particulates from the liquid; and

a venturi cylinder surrounding, spaced from and extending beyond the straightening chamber in the direction of the basin.

4,015,958

WET CENTRIFUGAL SEPARATOR FOR GAS

Kurt Leschonski, Clausthal-Zellerfeld, and Hans Rumpf, Karlsruhe, both of Germany, assignors to Kurt Leschonski, Germany

Continuation of Ser. No. 565,055, April 14, 1975, abandoned. This application May 20, 1976, Ser. No. 688,261

Claims priority, application Germany, Apr. 5, 1974, 2416583

Int. Cl.[2] B01D *47/10*

U.S. Cl. 55—235 11 Claims

1. Apparatus for removing impurities from a flow of gas, comprising:

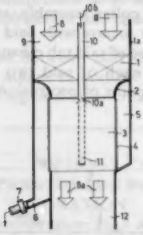
a housing including an outer wall having a gas inlet and a gas outlet;

cyclone means mounted in said gas inlet to impart a spiral direction to the incoming gas flow;

constriction means in said housing adjacent and downstream of said cyclone means to increase the velocity of the gas flow;

a separation chamber in said housing in communication

with said constriction means and said outlet, said separation chamber including a perforate wall spaced from said outer wall of said housing forming a liquid collection chamber therebetween; and



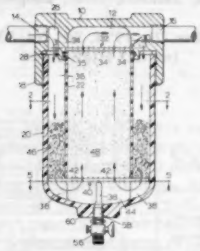
a liquid supply means including a spray nozzle centrally disposed in said separation chamber to spray droplets of cleansing liquid radially through the gas toward said perforate wall to capture impurities, said perforate wall passing the impurity-laden droplets into said liquid collection chamber.

4,015,959

IN-LINE FILTER FOR GASES

George A. Grote, Glen Rock, Pa., assignor to Beach Precision Parts Co., Glen Rock, Pa.

Filed Sept. 12, 1975, Ser. No. 613,043
Int. Cl.² B01D *29/04, 29/08*
U.S. Cl. 55—274 7 Claims



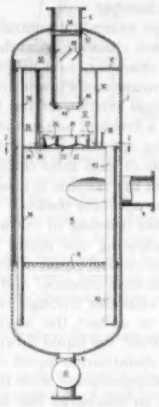
1. An in-line gas filter unit comprising in combination, a head defining a cavity having an inlet port for gases to be filtered and a discharge port for outlet of filtered gases, barrier means in said head between said ports, an outer transparent cup-shaped container having means on the open end separably connectable to said head for communication with only said inlet port, said container depending from said head and having a plurality of circumferentially spaced relatively short radial ribs extending uniform distances upwardly from the lower end of said container, an open-ended transparent inner tubular container of lesser diameter than said outer container positioned coaxially therein to provide an annular filter space therebetween, said head having an annular seat and the upper end of said inner container being received within said seat for communication only with said discharge port in said head and the lower end being axially spaced from the bottom of said outer container, sealing means in said seat engaging said upper end of said inner container, relative coarse filter material filling said annular space between said lower end of said inner container and an intermediate position between the ends of said inner container, thereby rendering the portion of said inner container between said upper end thereof and said coarse filter material visible through said outer container, an additional filter cartridge of desiccant filter material contained in a porous enclosure positioned within said inner container and extending substantially between the opposite ends thereof and in tight engagement with the inner surface thereof to insure passage of gases through said desiccant material for additional filtering thereby, upper and lower perforated rigid discs positioned respectively flatly across the opposite ends of said inner container and the perforations therein being sufficiently large to permit ready passage of gases therethrough without impeding the movement of said gases as the same pass to and from said desiccant filter material of said additional filter cartridge, the lower perforated rigid disc being supported upon said radial ribs and commonly supporting the lower ends of said coarse filter material and said additional filter cartridge, whereby the condition of said desiccant filter material is visible through said outer container and said upper portion of said inner container to indicate the need to replace said additional filter when necessary and gases pass downwardly through said coarse filter material and upwardly through said desiccant filter material in passage to said discharge port free of contaminating moisture and vapor.

4,015,960

CENTRIFUGAL SEPARATOR FOR SEPARATING ENTRAINED LIQUID FROM A STREAM OF LIQUID-BEARING GASES

Dale E. Nutter, Tulsa, Okla., assignor to Heat/Fluid Engineering Corporation, Tulsa, Okla.

Filed Mar. 17, 1975, Ser. No. 558,990
Int. Cl.² B01D *45/12*
U.S. Cl. 55—355 18 Claims



1. Apparatus for separating entrained liquid from a stream of liquid-bearing gases, comprising,

a circular wall forming a separation chamber which has a longitudinal axis, an upstream end, and a downstream end which is disposed above the upstream end, said wall having an interior surface equidistant from and facing the longitudinal axis,

means at the upstream end of the separation chamber for producing a tangential velocity component causing a helical flow of said liquid-bearing gases which flow is centered about the longitudinal axis and extends upward from the upstream end toward the downstream end of the separation chamber, whereby the particles of liquid entrained in the gases are thrust outwardly by centrifugal action to impinge and coalesce on said interior surface of the separation chamber wall,

a gas outlet tailpipe extending centrally and longitudinally into the separation chamber from the downstream end of the separation chamber, said tailpipe having an upper outlet opening means and a lower inlet opening means for receiving a central portion of the helical flow of gases which has only a residual amount of entrained liquid,

said tailpipe having aperture means therein located above and downstream of said inlet opening means, whereby residual liquid in the tailpipe is conducted from the tailpipe through the aperture means,

a lower liquid sump, a closed secondary chamber surrounding the aperture means, and drain conduit means for carrying liquid from the secondary chamber to the sump, said drain conduit means having an outlet opening submerged in liquid in the sump to sustain a pressure differential between the secondary chamber and the sump,

said apparatus having conduit means communicating between said secondary chamber and a point substantially at the center of said tailpipe downstream of the aperture means to reduce the pressure differential across said aperture means in the tailpipe and thus promote the flow of residual liquid through said aperture means.

12. Apparatus for separating entrained liquid from a stream of liquid-bearing gases, comprising,

a circular wall forming a separation chamber which has a longitudinal axis, an upstream end, and a downstream end which is disposed above the upstream end, said wall having an interior surface equidistant from and facing the longitudinal axis,

means at the upstream end of the separation chamber for producing a tangential velocity component producing a helical flow of said liquid-bearing gases which flow is centered about the longitudinal axis and extends upward from the upstream end toward the downstream end of the separation chamber, whereby the particles of liquid entrained in the gases are thrust outwardly by centrifugal action to impinge and coalesce on said interior surface of the separation chamber wall,

a gas outlet tailpipe extending centrally and longitudinally into the separation chamber from the downstream end of the separation chamber, said tailpipe having an upper outlet opening means and a lower inlet opening means for receiving a central portion of the helical flow of gases which has only a residual amount of entrained liquid,

said tailpipe having aperture means therein located above and downstream of said inlet opening means, whereby residual liquid in the tailpipe is conducted from the tailpipe through the aperture means,

a lower liquid drain opening in the wall of the separation chamber for releasing the liquid from the separation chamber, a deentrained liquid chamber surrounding the wall of the separation chamber and communicating with the separation chamber through the lower liquid drain opening so as to collect the liquid released from the separation chamber, the liquid flowing in a circular direction within the deentrained liquid chamber,

a downcomer communicating with the deentrained liquid chamber so as to discharge the liquid from the deentrained liquid chamber, and an overflow weir positioned in the deentrained liquid chamber in the flow path between the lower liquid drain opening and the downcomer, said lower liquid drain opening being disposed upstream of the overflow weir in the flow direction such that the overflow weir interrupts the circular flow of the liquid.

4,015,961

FILTER BAG AND COUPLING

Laurence M. Howard, Cresskill, N.J., and Robert Schaaf, Brooklyn, N.Y., assignors to Air Filters, Inc., Brooklyn, N.Y.

Filed Jan. 8, 1976, Ser. No. 647,612
Int. Cl.² B01D *46/02*
U.S. Cl. 55—378 **9 Claims**

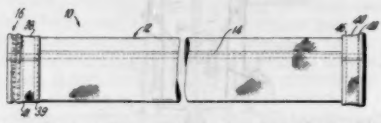
1. A filter bag for interconnecting to a socket of a cooperating member comprising:

a tubular filter member fabricated from a filter material;

an annular thin walled flexible band having axially spaced apart edges;

a plurality of discrete resilient tab means extending outwardly from an outer surface of said band, each of said tab means being defined by a free end struck outwardly from said band and a hinge line connecting each of said tab means to said band, said tab means being peripherally spaced apart from each other and being disposed along two axially separated paths around said band;

a flexible collar secured to said outer surface of said band to define a band and collar assembly, said collar being disposed on said tab means with said collar substantially conforming to shape of said tab means to provide discrete protrusions along each of said two paths and a recess between said two paths of protrusions;



said tubular filter member including retaining means for holding said band and collar assembly at one end of said tubular filter member;

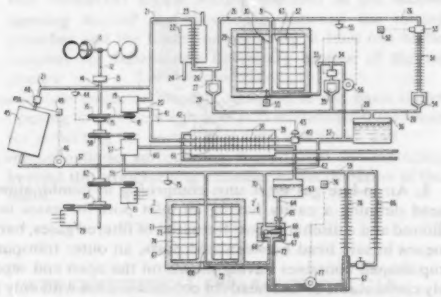
said one end of said tubular filter member being capable of snugly fitting into the socket of the cooperating member, whereby said resilient tab means are pressed inwardly to permit a portion of the socket member to be positioned in said recess between said separated paths, where said portion of the socket member is retained in said recess by the protrusions disposed on either side thereof.

4,015,962

TEMPERATURE CONTROL SYSTEM UTILIZING NATURALLY OCCURRING ENERGY SOURCES

Leo L. Tompkins, Jackson, Miss., assignor to Xenco Ltd., Jackson, Miss.

Filed Dec. 20, 1974, Ser. No. 534,922
Int. Cl.² F25B *27/00*
U.S. Cl. 62—2 **17 Claims**



1. A temperature control system for controlling the temperature within an enclosed structure comprising:

a. a source of heat;

b. a first heat exchanger for transferring heat from said source of heat to a liquid passing therethrough so as to cause said liquid to evaporate;

c. a first compressor connected to said first heat exchanger to raise the temperature and pressure of the evaporated liquid;

d. a wind driven device having an output shaft;

e. means operatively connecting said output shaft of said wind driven device to said first compressor such that said wind driven device drives said compressor;

f. heat radiating means connected to said compressor, and located within said enclosed structure to transfer heat from the evaporated liquid to the surrounding atmosphere causing said evaporated liquid to condense;

g. first liquid receiving means connected to said heat radiat-

ing means and said first heat exchanger to receive and store the liquid from the heat radiating means; and wherein said liquid comprises a refrigerant; and

h. a solar collector having an inlet connected to said first liquid receiving means and an outlet connected downstream of said compressor so as to transfer solar heat to the condensed refrigerant and cause the same to boil and evaporate; and

i. means interposed between said solar collector and said liquid receiving means to control the flow of condensed refrigerant entering said solar collector.

4,015,963

METHOD AND APPARATUS FOR FORMING FIBERS BY TORATION

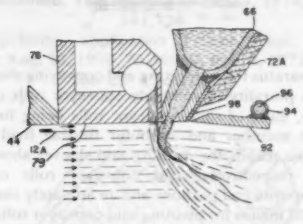
Marcel Levecque, Saint-Gratien; Jean A. Battigelli, and Dominique Plantard, both of Rantigny, all of France, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

Continuation-in-part of Ser. No. 353,984, April 24, 1973, Pat. No. 3,885,940. This application Mar. 6, 1975, Ser. No. 555,811

Claims priority, application France, Feb. 21, 1975, 75.05512

Int. Cl.² C03B *37/04*

U.S. Cl. 65—5 **30 Claims**



1. Equipment for making glass fibers comprising supply means for molten glass having a discharge orifice, means for establishing a gaseous blast directed in a path with a boundary of the blast adjacent the glass discharge orifice, means for establishing a gaseous jet directed in a path transverse to the path of the blast and penetrating the blast at a location upstream of the glass orifice, the jet being of smaller width than the width of the blast and separate plate means positioned downstream of the jet along the path of travel of the blast.

4,015,964

METHOD AND APPARATUS FOR MAKING FIBERS FROM THERMOPLASTIC MATERIALS

Marcel Levecque, Saint-Gratien; Jean A. Battigelli, and Dominique Plantard, both of Rantigny, all of France, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

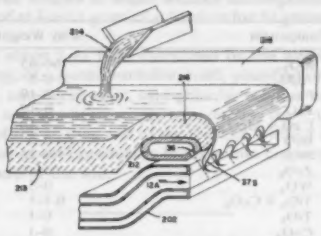
Continuation-in-part of Ser. No. 353,984, April 24, 1973, Pat. No. 3,885,940. This application Mar. 11, 1975, Ser. No. 557,282

Claims priority, application France, Dec. 26, 1975, 75.04970

Int. Cl.² C03B *37/04*

U.S. Cl. 65—5 **18 Claims**

1. A process for making fibres comprising establishing feed of a stream of attenuable material from a delivery means, establishing a gaseous blast directed in a path transverse to said stream in spaced relation to the delivery means so that said stream approaches the blast toward one side thereof, and establishing a gaseous jet of smaller cross section than that of the blast, the jet being directed toward the blast at the same side thereof as said stream, the jet having greater kinetic energy than the blast and penetrating the blast to establish a zone of interaction of the jet and the blast, and the stream of attenuable material being directed in a path independent of



the path of the jet and positioned to meet the blast at a point adjacent said zone of interaction.

4,015,965

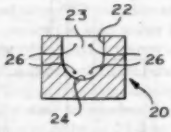
METHOD OF MAKING ARTIFICIAL INTRAOCULAR LENSES WITH HOLES

Emil W. Deeg, Woodstock, Conn., and David A. Krohn, Southbridge, Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed Dec. 22, 1975, Ser. No. 642,927

Int. Cl.² C03C *19/08, 15/00*

U.S. Cl. 65—23 **8 Claims**



1. The method of making a lens for a pseudophakos having spaced apart holes of preselected diametral dimension adjacent its edge comprising the steps of:

aligning and fixedly supporting a plurality of wires in spaced juxtaposition, the spacings between said wires corresponding to spacings between said holes to be produced in said lens and said wires being of diametral dimension corresponding to the diametral size preselected for said holes;

casting a molten ophthalmic lens glass over and around said plurality of wires;

allowing said molten glass to cool in place about said wires to produce a rigid preform of said lens;

removing said wires to produce holes in their place; and

at one stage of the process following said step of allowing said molten glass to cool, cutting, grinding and polishing at least a portion of said preform to the final size and configuration desired of opposite optical surfaces, center thickness and edge configuration of the finished pseudophakic lens.

4,015,966

MANUFACTURE OF X-RAY ABSORBING GLASS COMPOSITION BY A FLOAT GLASS PROCESS

Edward A. Weaver, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed June 1, 1976, Ser. No. 691,929

Int. Cl.² C03B *18/02*

U.S. Cl. 65—65 A **5 Claims**

1. In the process for melting an X-ray absorbing glass composition having an LAC of at least about 26/cm at 0.6 A which composition is adapted for use as the faceplate of a cathode ray television tube, wherein a glass batch for said composition is melted to yield a molten glass, and the resulting molten glass is floated on a bath of molten tin, the improvement wherein

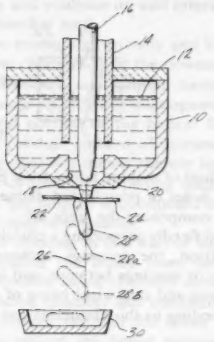
said X-ray absorbing glass composition is free of the oxides of lead, antimony and arsenic and consists essentially of:

Component	% by Weight
SiO_2	60–65
Al_2O_3	0–5
Na_2O	2–10
K_2O	0–17
$CaO + MgO$	2–10
BaO	0–5
SrO	5–15
ZrO_2	0–10
WO_3	0–5
$TiO_2 + CeO_2$	0.1–1
TiO_2	0–1
CeO_2	0–1
Fe_2O_3	0–1.

4,015,967
METHOD FOR SHEARING AND TURNING THE GLASS GOB

William R. Ward, Jr., Columbus, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 31, 1976, Ser. No. 672,214
Int. Cl.² C03B 5/38
U.S. Cl. 65—133 3 Claims



1. A method for shearing gobs of glass from a vertically flowing stream of molten glass wherein lateral motion is imparted to the gob being sheared, which comprises the steps of:

advancing one of an opposed pair of shear blades horizontally toward the centerline of said glass stream;

simultaneously advancing the other one of said opposed pair of shear blades horizontally toward said centerline of said glass stream;

overlapping said pair of shear blades at approximately said glass stream centerline to thereby shear said gob from said glass stream;

withdrawing said first mentioned shear blade from said glass stream centerline while continuing to maintain said pair of shear blades in an overlapping configuration;

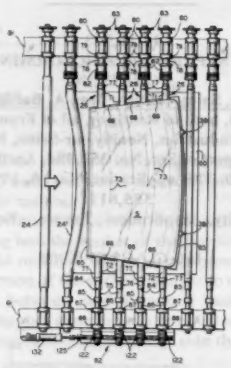
advancing said second mentioned shear blade to a location beyond said glass stream centerline in the direction of withdrawal of said first mentioned shear blade in synchronism with the withdrawal of said first mentioned shear blade to thereby maintain overlapping configuration of said pair of shear blades, whereby the travel of said second mentioned shear blade beyond said glass stream centerline in synchronism with said first mentioned shear blade will cause a lateral motion of said gob being sheared; and

withdrawing said second mentioned shear blade from the position it attained beyond said glass stream centerline.

4,015,968
GLASS SHEET SUPPORTING AND CONVEYING APPARATUS

Robert G. Revells, Toledo, Ohio; Earl J. Olson, and Charles W. Sutton, both of Lathrop, Calif., assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Nov. 20, 1975, Ser. No. 633,868
Int. Cl.² C03B 23/02
U.S. Cl. 65—289 5 Claims



1. In apparatus for supporting and conveying sheets of glass, a frame, a plurality of rotatable conveyor rolls mounted on said frame, each of said conveyor rolls being formed of an inner core member and an outer flexible load supporting sleeve, drive means for rotating said sleeves about said core members, respectively, said conveyor rolls each having straight opposite end portions and an arcuately shaped central portion, and means for pivoting said conveyor rolls to displace said central portions of said rolls from a common plane supporting said glass sheet to angular positions disengaging said roll central portions from said glass sheet; the improvement wherein said pivoting means comprises a shaft operatively connected to said inner core member of each of said rolls, a coupling mounted on each said shaft and having a first section rigidly secured to said shaft and a second section freely rotatable on said shaft, means for rotating the several second coupling sections, means transmitting the torque from said second coupling sections to said first coupling sections to effect shifting of said conveyor roll central portions between said common plane and said angular positions, and means for angularly adjusting one of said coupling sections relative to the other of said coupling sections.

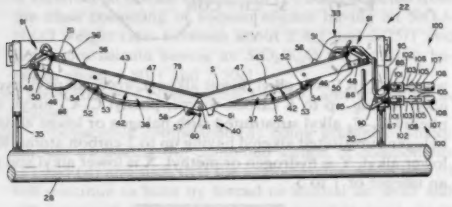
4,015,969
APPARATUS FOR BENDING GLASS SHEETS TO RELATIVELY SHARP ANGLES

Laurence A. Brown, Toledo; Floyd T. Hagedorn, Oregon, and Foster V. Waltz, Jr., Toledo, all of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Jan. 2, 1976, Ser. No. 646,234
Int. Cl.² C03B 23/02
U.S. Cl. 65—289 13 Claims

1. In apparatus for bending a glass sheet to a relatively sharp angle by passing an electric current through an electrically conducting line formed on the sheet with a portion extending along a line about which heat is generated to bend the sheet therealong and which includes a frame, an outline type bending mold supported on said frame and having a shaping surface formed thereon, electrically conducting means including at least one electrical contact mounted on said mold in spaced relation to said shaping surface and engageable with said

electrically conducting line on said glass sheet supported on said mold; the improvement which comprises a holder for said contact, a support, means connecting said holder to said support, means pivotally mounting said support on said mold for



pivotal movement between a glass engaging position and a glass disengaged position, and means for biasing said support into said glass engaging position to urge said contact against said electrically conducting line.

4,015,970

GRANULAR PRODUCTS FOR SOIL TREATMENT

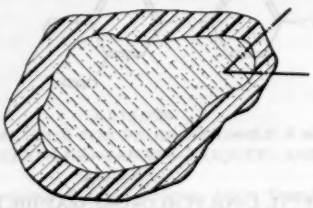
Claude Hennart, Aubervilliers, France, assignor to Airwick Industries, Inc., Carlstadt, N.J.

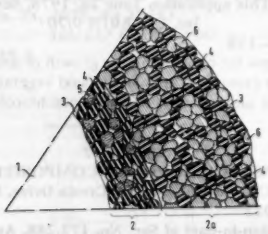
Continuation of Ser. No. 198,550, Nov. 15, 1971, abandoned, which is a continuation-in-part of Ser. No. 854,403, Sept. 2, 1969, abandoned. This application Oct. 3, 1974, Ser. No. 511,726

Claims priority, application France, Sept. 6, 1968, 68.165314; Aug. 20, 1970, 70.30538; Apr. 8, 1971, 71.12474

Int. Cl.² C05G *3/00*

U.S. Cl. 71—11 **19 Claims**





1. Coated granular product for the treatment of soil which comprises a central solid nucleus, constituting from about 65 to 99% of the weight of the granule, said nucleus consisting of at least 40 to 100% of its weight of a fertilizer material which is soluble in water without decomposition, and a coating of one or several layers constituting from about 1 to 35% of the weight of the granule, at least one layer of said coating comprising particles of an active substance different from that of the nucleus and selected from fertilizers and substances providing plants with oligo-elements, said granular product being characterized in that said layers essentially consist of

a. from about 90 to 99%, calculated on the weight of said coating, of particles of a solid material having an average main diameter not exceeding 0.2mm of which at least 25%, calculated on the weight of the coating, consist of a material soluble in water without decomposition in the ratio of at least 1 gram of substance for 50 grams of water and

b. from about 1 to 10%, calculated on the weight of said coating, of a water-insoluble, solid, plastified or nonplastified, non-cured resin, said granular product being nondusty and non-hygroscopic but releasing the active materials of the coating and of the nucleus, without any delay as soon as said product is brought into contact with the moisture of the soil.

4,015,971

METHOD OF PRODUCING FERTILIZERS FROM SEA-LIKE WATERS

Valery Pavlovich Barannik, ulitsa Gogolya, 24, kv. 24, and Arkady Georgievich Kolesnikov, ulitsa Lenina, 33, kv. 51, both of Sevastopol, U.S.S.R.

Filed Feb. 6, 1975, Ser. No. 547,875

Int. Cl.² C05D *9/02*

U.S. Cl. 71—31 **4 Claims**

1. A method of producing fertilizers from sea-like waters comprising introducing, into said water, bivalent iron ions in an amount within the range of from 10 to 100 mg per liter of water at a pH of from 5 to 9, said bivalent iron ions being oxidized and transformed into trivalent iron ions with the formation of iron hydroxide; allowing the iron hydroxide-containing water to stand to permit sorption of microelements and organic substances present in said water by said iron hydroxide at a sorption time of at least 0.1 hour within said pH range without sorption of sodium chloride under said conditions; separating the resulting precipitate; drying the separated precipitate to the air-dry state to produce a fertilizer containing mainly iron in an amount of from 23.4 to 31.5%, total carbon 2.3 to 6.0% and total amount of microelements of 0.1 to 0.3%.

4,015,972

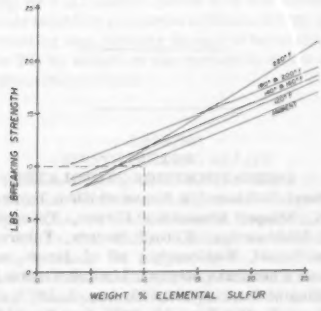
FORTIFIED GYPSUM GRANULE

Kenneth Ray Watkins, Wheaton, and Robert John Wenk, Arlington Heights, both of Ill., assignors to United States Gypsum Company, Chicago, Ill.

Filed Aug. 13, 1975, Ser. No. 604,366

Int. Cl.² C05D *3/02*

U.S. Cl. 71—31 **10 Claims**



1. A hard, scarcely dusting gypsum granule composition consisting essentially of a combination of at least about 5% by weight of elemental sulfur and a major proportion of calcium sulfate, said granule having a resistance to attrition on the order of at least about 70.

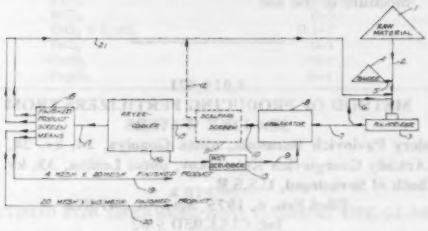
4,015,973
LIMESTONE-EXPANDING CLAY GRANULES AND METHOD OF MAKING THEM

Paul M. Perrine, Aurora, Ind., assignor to American Pelletizing Corporation, Aurora, Ind.

Continuation-in-part of Ser. No. 439,364, Feb. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 335,022, Feb. 23, 1973, abandoned. This application Dec. 20, 1974, Ser. No. 534,687

Int. Cl.² C05D *3/02*

U.S. Cl. 71—63 **4 Claims**



1. The process of preparing soil neutralizer and conditioner granules which both neutralize the soil and increase the water and neutrient holding capacity thereof, which comprises the steps:

A. mixing and grinding about 90 to 99% by weight of a finely divided calcium and magnesium bearing raw material selected from the group consisting of limestone, dolomitic limestone, and marl, with about 1% to 10% by weight of high expansion sodium bentonite;

B. continuously recycling a portion of the mixture for further grinding to produce the needed percentage of fines for a better and more uniform final product;

C. agitating the mixture and gradually adding water thereto so that the mixture has a water content of from about 1 to about 15% by weight, based on the weight of the dry material, to form granules, said water being sufficient in amount to activate the sodium bentonite;

D. drying the granules at a temperature within the range from about 100° to about 1000° F., and

E. screening the dried granules to recover the granules having a particle size which will pass through a ½ inch screen and at least be retained on a 60 mesh screen, said granules containing about 90 to 99% by weight of said raw material and about 1 to 10% by weight of said sodium bentonite.

4,015,974
AMIDO PHOSPHOROTHIOLATES

Takeo Satomi, Nishinomiya; Naganori Hino, Toyonaka; Koshi Tateishi, Minoo; Masachika Hirano, Toyonaka; Kunio Mukai, Nishinomiya; Katsuji Nodera, Takarazuka, and Mitsuru Sasaki, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

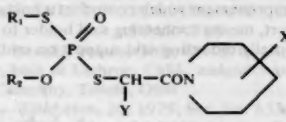
Continuation of Ser. No. 385,473, Aug. 3, 1973, abandoned. This application Sept. 30, 1975, Ser. No. 618,264

Claims priority, application Japan, Aug. 5, 1972, 47-78666; May 24, 1973, 48-58833

Int. Cl.² C07D *211/16*

U.S. Cl. 71—87 **13 Claims**

1. A compound of the formula



(I)

wherein R_1 is lower alkyl, lower alkenyl, lower alkynyl, cycloalkyl having up to 6 carbon atoms, phenyl C_1-C_2 alkyl, and phenyl C_1-C_2 alkyl substituted with halogen or lower alkyl or halogen substituted alkenyl having up to 3 carbon atoms; R_2 is lower alkyl; Y is hydrogen or methyl, X is lower alkyl and n is an integer of 1 to 5.

4,015,975
COMPOSITIONS CONTAINING ALKYL 2-NITRO-5-(2',4'-DICHLOROPHENOXY)-THIOBENZOATES, AND METHOD OF USE THEREOF

Saburo Tamura, Tokyo; Tetsuo Takematsu, Utsunomiya, and Hisae Haruta, Ibaraki, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

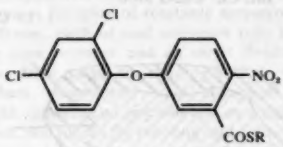
Division of Ser. No. 542,052, Jan. 17, 1975, Pat. No. 3,953,489. This application Jan. 28, 1976, Ser. No. 653,117

Claims priority, application Japan, Apr. 10, 1974, 49-41129; June 10, 1974, 49-66276

Int. Cl.² A01N *9/12*

U.S. Cl. 71—100 **18 Claims**

1. A method of killing weeds, which comprises applying to said weeds an amount effective to injure said weeds of a compound of the formula:



wherein R is lower alkyl.

4,015,976
N-ACETYL L-POLYCHLOROBENZAMIDE HERBICIDES

Lewis William Watts, Jr., Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Division of Ser. No. 379,460, July 16, 1973, Pat. No. 3,959,370. This application June 26, 1975, Ser. No. 590,745

Int. Cl.² A01N *9/20*

U.S. Cl. 71—118 **1 Claim**

1. A process for controlling the growth of undesirable vegatation which comprises applying to said vegetation a herbicidally effective amount of N-acetly-pentachlorobenzamide.

4,015,977
PETROLEUM COKE COMPOSITION

Chester C. Crawford, 13385 La Cresta Drive, Los Altos Hills, Calif. 94022

Continuation-in-part of Ser. No. 172,288, Aug. 16, 1971, abandoned. This application Apr. 24, 1974, Ser. No. 463,511

Int. Cl.² C22B *1/08*

U.S. Cl. 75—3 **7 Claims**

1. Metallurgical grade carbonaceous material in the form of agglomerates not less than about ¼ inch in diameter and suitable for use in metallurgical and calcining equipment for metal reduction, metal melting and calcining processes, said agglomerates consisting essentially of (a) a carbonaceous component, (b) an alkali metal silicate and (c) refractory component which is a metal oxide or a derivative of a metal oxide which on heating under conditions of use yields a metal oxide

said carbonaceous component (a) containing petroleum coke as at least a major ingredient, being present in the agglomerates in the form of particles the major part of which by weight are greater than 200 mesh in size;

said alkali metal silicate component (b) being selected from the class consisting of sodium silicate having an SiO_2/Na_2O weight ratio between about 2.4/1 and 3.75/1 and potassium silicate having an SiO_2/K_2O weight ratio between about 1.80/1 and 2.50/1;

the proportions of components (a), (b) and (c) being as follows:

the carbonaceous component (a) being present in major amount exceeding the combined weight of components (b) and (c) and such that the agglomerates, when ignited will continue to burn by forced or natural air draft and will serve as a reductant for ferrous metal oxides, to melt ferrous metal or to calcine linestone,

the alkali metal silicate component (b) being present in an amount not less than about 4% by weight of the agglomerates and sufficient to act as a binder for the carbonaceous component (a);

the refractory component (c) being selected and being present in an amount to increase the softening point of component (b) and to avoid softening of the agglomerates at service temperatures not less than about 2000° F.

said agglomerates having a mechanical strength sufficient to pass the drop-shatter test of ASTM D141-48.

4,015,978

METHOD FOR PRODUCTION OF MAGNESIUM-CONTAINING BRIQUETS AND MAGNESIUM

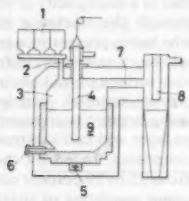
Tomoo Matsushima; Tsutou Odajima; Junzo Tsuruki, and Yasuo Yoshida, all of Yokohama, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,490

Claims priority, application Japan, Feb. 21, 1975, 50-20852; Feb. 21, 1975, 50-20853

Int. Cl.² C22B *29/00*

U.S. Cl. 75—10 A **12 Claims**



1. Magnesium-containing briquets containing, as components each in a finely divided and dispersed state, magnesium oxide, components naturally present in a magnesium ore, one member selected from the group consisting of ferrosilicon and silicon, and calcium oxide, and having an overall bulk density in the range of from 1.4 to 2.2 g/cm³, squeeze strength at room temperature in the range of from 30 to 230 kg/cm², an overall porosity in the range of from 35 to 55% and a refractoriness in the range of Pyrometric Cone No. 15 to No. 31.

4,015,979

BONDING OF PARTICULATE MATERIALS

Robert Anthony Fishburn, and Frank Ernest George Ravault, both of Birmingham, England, assignors to Foseco International Limited, Birmingham, England

Continuation of Ser. No. 419,882, Nov. 28, 1973, abandoned. This application Oct. 31, 1975, Ser. No. 627,784

Claims priority, application United Kingdom, Dec. 11, 1972, 57048/72; Dec. 11, 1972, 57049/72

Int. Cl.² B01J *2/00*

U.S. Cl. 75—25 **5 Claims**

1. A method of bonding particulate material containing a source of metal ions which material is capable of reacting with an aqueous solution of formic acid to give ions of said metal, consisting essentially of:

a. treating said particulate material with said formic acid solution to form an acid solution containing ions of said metal together with unreacted or undissolved particulate material,

b. increasing the pH of said solution to convert said metal ions to a precipitated metal hydroxide, and

c. bonding said unreacted or undissolved particulate material with said hydroxide as a binder formed by steps (a) and (b).

4,015,980

USE OF FLUORINATED β-DIKETONES IN THE SOLVENT EXTRACTION OF ZINC

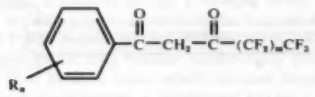
Kenneth D. MacKay, Circle Pines, Minn., and R. Brantley Sudderth, Tucson, Ariz., assignors to General Mills Chemicals, Inc., Minneapolis, Minn.

Filed Aug. 4, 1975, Ser. No. 601,765

Int. Cl.² C22B *19/26*

U.S. Cl. 75—120 **6 Claims**

1. The process of recovering zinc from an aqueous ammoniacal solution thereof which comprises contacting said solution with a solution of a fluorinated β-diketone dissolved in an essentially water immiscible liquid hydrocarbon solvent to extract at least a portion of the zinc into the organic phase, separating the organic phase from the aqueous phase and stripping zinc from the organic phase, said β-diketone having the formula



where n is a whole integer of 1 to 4, m is 0, 1 or 2 and R is an alkyl group of 1–25 carbon atoms with the proviso that R_n must provide solubility properties sufficient for the β-diketone and the resulting zinc complex thereof to be soluble at a level of at least 2% by weight in the essentially water immiscible liquid hydrocarbon solvent.

4,015,981

TOOTH FILLING ALLOY

Svetlana Tanovna Rogova, ulitsa Belomorskaya, 18, korpus 4, kv. 44; Mikhail Vladimirovich Pikunov, Vtoraya Parkovaya, 44, korpus 3, kv. 147; Alla Ivanovna Kuptsova, Slavyansky bulvar, 47, kv. 32; Galina Zakharovna Obukhova, Simferopolsky proezd, 16, korpus 2, kv. 82; Dmitry Mikhailovich Karalnik, Krasnoyarskaya ulitsa, 5, korpus 2, kv. 159, and Anatoly Ivanovich Rybakov, ulitsa Bakinskikh komissarov, 3, korpus 1, kv. 84, all of Moscowcow, U.S.S.R.

Filed Mar. 30, 1976, Ser. No. 671,955

Int. Cl.² C22C *30/02*, *30/04*

U.S. Cl. 75—134 B **1 Claim**

1. A tooth filling alloy having the following composition, in percent by weight:

gallium	36 – 40
tin	26 – 27
copper	34 – 37

and prepared by mixing together 40 – 45 percent by weight of a eutectic liquid gallium-tin alloy containing 11 percent by weight of tin, with 55 – 60 percent by weight of a powdered copper-tin alloy of the formula Cu_3Sn, having particles of maximum size of 40 microns and containing 55 – 70 percent by weight of particles of Cu_3Sn under 20 microns in size.

4,015,982

MOLD FOR CONTINUOUS CASTING PROCESS

Katashi Saito; Kiminari Kawakami, and Moriyuki Ishiguro, all of Hiroshima, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 504,144, Sept. 9, 1974, abandoned, which is a continuation of Ser. No. 338,640, March 6, 1973, abandoned. This application July 29, 1975, Ser. No. 599,995

Claims priority, application Japan, Mar. 7, 1972, 47-22784

Int. Cl.² C22C *9/00, 9/04*

U.S. Cl. 75—156.5 **10 Claims**

1. A continuous casting, consisting essentially of Cu, 83 to 88%; Pb, maximum 0.5%; combination of Sn, Al and Fe, total 1.0% and remainder Zinc; and having a cooling capacity of 0.1 to 0.7 [Cal/(cm$^{2.0}$ C$\sqrt{\text{sec}}$)] and thermal conductivity of 0.3 to 0.7 [Cal/(cm·sec^{-6} C)].

4,015,983

METHOD OF ERASING MANIFOLD IMAGES

Philip C. Schoonover, E. Rochester, N.Y., and Martin S. Maltz, Mississauga, Canada, assignors to Xerox Corporation, Samford, Conn.

Continuation-in-part of Ser. No. 575,107, May 6, 1975, abandoned. This application June 30, 1976, Ser. No. 701,324

Int. Cl.² G03G *17/00, 13/00*

U.S. Cl. 96—1 M **4 Claims**

1. A method for forming and erasing a manifold image which comprises the steps of:

a. providing a sandwich comprising a layer of electrically photosensitive imaging material interpositioned between a donor sheet and a receiver sheet, said layer being structurally fracturable in response to the combined effect of an applied electrical field and exposure to electromagnetic radiation to which said material is sensitive, at least one of said sheets being at least partially transparent to said electromagnetic radiation;

b. exposing said layer to said electromagnetic radiation while said layer is subjected to a first electrical field of a predetermined voltage, one of said first electrical field and said radiation comprising an imagewise pattern while the other is uniformly applied to said imaging material layer, whereby a fracturable manifold image is created in said layer responsive to said imagewise pattern; and

c. uniformly applying in the dark an erasure electrical field of the same polarity as said first electrical field, said erasure electrical field having a voltage sufficiently higher than said predetermined voltage to cause substantially all of said layer to adhere preferentially to one of said sheets, whereby said fracturable manifold image is erased from said sandwich.

4,015,984

INORGANIC PHOTOCONDUCTOR IN GLASS BINDS WITH GLASS OVERCOAT LAYER

Wasaburo Ohta, and Koji Hirakura, both of Tokyo, Japan, assignors to Kabushiki Kaisha Ricoh, Tokyo, Japan

Continuation-in-part of Ser. No. 469,857, May 14, 1974, abandoned. This application May 28, 1975, Ser. No. 581,492

Claims priority, application Japan, May 17, 1973, 48-054872; July 18, 1973, 48-080268

Int. Cl.² G03G *5/04*

U.S. Cl. 96—1.5 **5 Claims**

1. A photosensitive material for use in electrophotography requiring at least two stages of charging, comprising a conductive substrate coated with a photoconductive layer containing an inorganic photoconductive substance and an inorganic glass and a transparent, inorganic glass insulating layer containing an inorganic high-dielectric substance, the said substance having a specific dielectric constant of from 10^2 to 10^4, the weight ratio of the inorganic photoconductive substance to the inorganic glass in the photoconductive layer being in the range of from 1:4 to 2:1, and the amount of the inorganic high-dielectric substance in the insulating layer being up to 25% by weight of that of the inorganic glass.

4,015,985

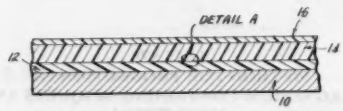
COMPOSITE XEROGRAPHIC PHOTORECEPTOR WITH INJECTING CONTACT LAYER

Robert N. Jones, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 9, 1975, Ser. No. 566,456

Int. Cl.² G03G *5/08*

U.S. Cl. 96—1.5 **5 Claims**



1. A photosensitive member comprising a conductive substrate, an intermediate layer overlying said substrate and a photoconductive layer overlying said intermediate layer, said photoconductive layer comprising an insulating organic resin matrix containing therein photoconductive particles from 0.01 to 1.0 microns in size, with substantially all of the photoconductive particles being in substantial particle-to-particle contact in said member in a multiplicity of interlocking photoconductive paths through the thickness of said layer, said photoconductive paths being present in a volume concentration, based on the volume of said layer, of from about 1 to 25 percent, with the outer surface of said photoconductive layer comprising organic resin material, said intermediate layer comprising an insulating organic resin matrix bonded to both said photoconductive layer and said substrate, said intermediate layer further comprising, based on the volume of said intermediate layer, from 25 to 99 percent conductive particles selected from the group consisting of silver, gold, platinum, copper and brass ranging in size from 0.1 to 5.0 microns dispersed uniformly in said intermediate layer, said intermediate layer being joined to said photoconductive layer along an interface wherein at least a portion of said photoconductive particles in said photoconductive layer contact at least a portion of said conductive particles in said intermediate layer, said conductive particles having available charge carriers at suitable energy levels whereby said photoconductive particle to conductive particle contact points constitute individual charge carrier injecting contact points.

4,015,986
METHOD OF DEVELOPING AND STRIPPING POSITIVE PHOTORESIST

Gabor Paal, Stuttgart, and Jürgen F. Wüstenhagen, Boeblingen, both of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 22, 1975, Ser. No. 607,000

Claims priority, application Germany, Oct. 3, 1974, 2447225

Int. Cl.² G03C *5/00*; G03F *7/08*

U.S. Cl. 96—36 **3 Claims**

1. A method of forming a patterned resist mask on a substrate comprising coating a layer of novolak resin based positive photoresist comprising an alkali-soluble phenolformaldehyde novolak resin and a 1,2-diazide naphthoquinone sensitizer, on said substrate, selectively exposing said layer to actinic radiation through a patterned mask, subsequently baking said layer at a temperature between 130° and 210° C, and then developing said layer with an aqueous solution consisting essentially of between about 0.038 and 1.5 percent by weight of a permanganate and between about 2 to 30 percent by weight of phosphoric acid such that only the exposed areas of said layer area completely removed to leave a patterned resist mask of unexposed resist on said substrate.

4,015,987
PROCESS FOR MAKING CHIP CARRIERS USING ANODIZED ALUMINUM

Robert F. Garry, Sunnyvale, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 13, 1975, Ser. No. 604,392

Int. Cl.² G03C *5/00*

U.S. Cl. 96—36.2 **5 Claims**

1. A process for making chip carriers with an anodized aluminum substrate comprising:

punching registration and center holes in an aluminum substrate;

anodizing the aluminum substrate;

coating the top surface of said substrate with adhesive;

laminating a thin metal foil to said top surface;

coating said metal surface with photo resist;

pin registration printing the image of a circuit by masking said photo resist covered metal surface with a photo template registered to said substrate and irradiating the exposed photo resist;

developing the image of the electrical circuit by removing the exposed or non-exposed portions of the photo resist;

etching the bared developed portions of said thin metal foil to form leads;

recoating the substrate with photo resist;

exposing the photoresist in areas overlying said leads to radiation;

baring said leads by developing of the photoresist;

plating said leads with thick nickel;

exposing the remainder of said photoresist to bare the remainder of said circuit; and

activating and plating said circuit, said circuit comprising the nickel coated leads and the bared metal foil, with gold.

4,015,988
MULTILAYER COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Keisuke Shiba; Takeshi Hirose; Jun Hayashi, and Toshiaki Aono, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Mar. 4, 1975, Ser. No. 555,314

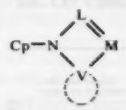
Claims priority, application Japan, Mar. 4, 1974, 49-25482

Int. Cl.² G03C *1/76, 7/00, 1/06, 1/40*

U.S. Cl. 96—69 **14 Claims**

1. A multilayer color photographic light-sensitive material which comprises a support having thereon at least two silver halide emulsion layer units, each of which is sensitive to radiation of a substantially different wavelength region within the wavelength region from about 220 nm to about 800 nm and which contains a color-forming coupler capable of forming a dye on coupling with an oxidized primary aromatic amine developing agent,

with at least one of the emulsion layer units containing an ICC coupler represented by the general formula (I)

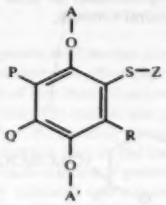


(I)

wherein Cp represents a coupler residue bonded at its coupling position to the N of formula (I); L and M each represents a nitrogen atom or a

methine group, and at least one of L and M represents a nitrogen atom; and V represents a monocyclic or dicyclic aromatic ring of the benzene series; which releases a triazole derivative or a diazole derivative on coupling with an oxidized primary aromatic amine developing agent, and

with the emulsion layer unit containing the ICC coupler or another layer containing a hydroquinone derivative represented by the general formula (II)



(II)

wherein A and A′ each represents a hydrogen atom or a group capable of being eliminated by an alkali, and A′ can combine with R or Q to form a ring; P, Q or R each represents a hydrogen atom, an alkyl group, an aryl group, an alkylthio group, an arylthio group, a hydroxy group, a halogen atom, an alkoxy group, an aryloxy group, a heterocyclic ring or an —S—Z group, and P and Q can combine to form a ring; and Z represents a heterocyclic ring residue substantially photographically inert in a bonded state; which releases imagewise depending upon development a compound having a mercapto group and/or a coupler which releases a compound having a mercapto group on coupling with an oxidized primary aromatic amine developing agent.

4,015,989
COLOR LIGHT-SENSITIVE MATERIAL WITH SPONTANEOUSLY DEVELOPABLE SILVER HALIDE EMULSION CONTAINING DESENSITIZING DYE

Yasushi Oishi, and Masanao Hinata, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jan. 30, 1975, Ser. No. 545,671

Claims priority, application Japan, Jan. 30, 1974, 49-12453

Int. Cl.² G03C *1/40, 1/76, 1/48, 7/00*

U.S. Cl. 96—77 **26 Claims**

1. A color photographic light-sensitive material which comprises a support having thereon at least one emulsion layer unit comprising:

A. a hydrophilic colloid layer containing spontaneously developable silver halide grains which are associated with a color coupler capable of reacting with an oxidation product of an aromatic primary amino colour developing agent to provide a dye and which are rendered substan-

tially light-insensitive with a desensitizing dye which is so strongly adsorbed on said spontaneously developable silver halide grains that it does not substantially migrate to a negative-type light sensitive silver halide emulsion layer adjacent thereto, and,

B. an adjacent negative-type light-sensitive silver halide emulsion layer associated with a compound capable of reacting with an oxidation product of an aromatic primary amino color developer to release a diffusible development inhibitor.

4,015,990

COLOR PHOTOGRAPHIC LIGHTSENSITIVE MATERIAL

Yaichi Ishida; Hiroshi Ikeda, and Shigetoshi Hiraishi, all of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

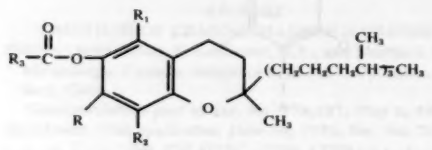
Filed June 19, 1975, Ser. No. 588,653

Claims priority, application Japan, July 9, 1974, 49-78421

Int. Cl.² G03C *1/84, 7/00*

U.S. Cl. 96—84 UV **8 Claims**

1. In a color photographic lightsensitive material comprising a support and, coated thereon, a coupler-dispersed silver halide emulsion, the improvement in that the said emulsion contains as a light-fading stabilizer at least one tocopherol derivative having the general formula,



(1)

wherein R, R_1 and R_2 represent individually a hydrogen atom or a methyl group; and R_3 represents a straight chain or branched-chain alkyl group having 1 to 18 carbon atoms, or a methyl substituted or unsubstituted aryl group.

3. A color photographic lightsensitive material as claimed in claim **1**, which additionally contains an ultraviolet absorber.

4,015,991

LOW FLUID LOSS CEMENTING COMPOSITIONS CONTAINING HYDROLYZED ACRYLAMIDE/2-ACRYLAMIDO-2-METHYLPROPANE SULFONIC ACID DERIVATIVE COPOLYMERS AND THEIR USE

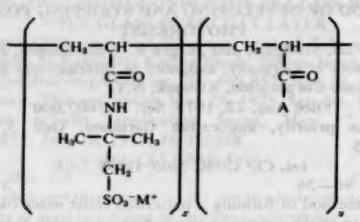
Leonard J. Persinski, Pittsburgh, Pa.; Michael M. Cook, Boxford, Mass., and Sally Lee Adams, Pittsburgh, Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 602,940, Aug. 8, 1975, abandoned. This application May 10, 1976, Ser. No. 684,530

Int. Cl.² C04B *7/35*

U.S. Cl. 106—90 **3 Claims**

1. A low fluid loss cement composition capable of forming a fluid slurry when mixed with water, said cement composition comprising dry hydraulic cement and from about 0.05 to about 5.0 percent by weight, based on weight of hydraulic cement on a dry basis, of a water-soluble copolymer having a molecular weight of at least 10,000, said copolymer having the formula:



wherein A is independently selected from $—NH_2$ and $—^-M^-$, provided at least 20 percent of the A groups are $—^-M^+$; M is hydrogen, ammonium, sodium or potassium; *x* is from about 10 to about 90 mole percent; and *y* is from about 90 to about 10 mole percent.

4,015,992

PROCESS FOR ACTIVATING A NON-CONDUCTIVE SUBSTRATE AND COMPOSITION THEREFOR

Horst Jung, Bielefeld; Karl-Wilhelm Sassenroth, Heepen, and Nikolaus Ferenczy, Altenhagen, all of Germany, assignors to Dr. Hesse & Cie. Spezialfabrik fur Galvanotechnik, Bielefeld-Heepen, Germany

Filed Nov. 19, 1973, Ser. No. 416,812

Claims priority, application Germany, Nov. 23, 1972, 2257378

Int. Cl.² C23C *3/02*

U.S. Cl. 106—1 **3 Claims**

1. An aqueous composition for activating a non-conductive substrate prior to metallization, consisting essentially of the reaction product obtained by reducing a solution of a salt of a metal of the palladium or platinum group or of gold with an excess of a polysaccharide, or a derivative thereof, capable of serving as a protective colloid for a noble metal sol and having at least one reactive aldehyde group, said composition having a pH of from 1.5 to 4.5.

4,015,993

HYDRAULIC COMPOSITION WITH ADDITIVE

Tadao Natsuume, Yokosuka, Japan, assignor to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Feb. 12, 1975, Ser. No. 549,486

Claims priority, application Japan, Feb. 19, 1974, 49-19730

Int. Cl.² C04B *7/02, 7/35*

U.S. Cl. 106—90 **9 Claims**

1. A hydraulic composition comprising 100 parts by weight of a hydraulic substance selected from portland cement, alumina cement, blast furnace slag or a mixture of quicklime and siliceous sand and 0.01–2 parts by weight of a cyclopentane derivative selected from 1,2,3,4-cyclopentanetetracarboxylic acid and alkali metal, alkaline earth metal and ammonium salts of 1,2,3,4-cyclopentanetetracarboxylic acid.

4,015,994

COATED GLASS FIBERS

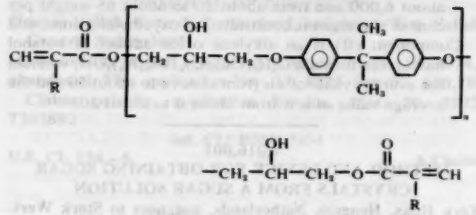
Homer G. Hill, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation-in-part of Ser. No. 523,306, Nov. 13, 1974, abandoned, which is a division of Ser. No. 442,529, Feb. 14, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 622,186

Int. Cl.² C04B *7/02*

U.S. Cl. 106—99 **9 Claims**

1. A cementitious product comprising a composite of reinforcing materials and a cementitious matrix wherein one of the reinforcing materials comprises glass fibers having a thin coating on the surfaces of the fibers wherein the coating consists essentially of a vinyl ester represented by the formula:



wherein *n* is a number from 1 to 20 and each R group is hydrogen or an alkyl radical having 1 to 10 carbon atoms.

4,015,995

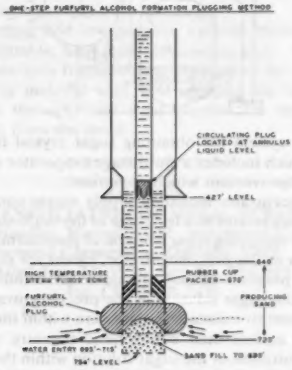
METHOD FOR DELAYING THE SETTING OF AN ACID-SETTABLE LIQUID IN A TERRESTRIAL ZONE

Patrick H. Hess, Diamond Bar, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 418,624, Nov. 23, 1973, Pat. No. 3,943,084, which is a division of Ser. No. 273,256, July 19, 1972, Pat. No. 3,850,249. This application Aug. 25, 1975, Ser. No. 607,312

Int. Cl.² C08K *3/36*

U.S. Cl. 106—287 S **5 Claims**



1. The method of setting an acid-settable liquid which sets at a temperature in the range from about −10° C. to 175° C. at a pH of less than about 5, which comprises dissolving in said liquid in parts by weight an amount of a delayed latent catalyst in the range from about 2 to 20 parts per 100 parts of the liquid, said catalyst being a mixture of a component which releases a strong acid and a basic component wherein the mixture contains an amount of base in the range from 0.02 to 0.98 equivalent per equivalent of releasable strong acid from the acid-releasing component; said liquid being an inorganic liquid selected from the group consisting of inorganic aqueous or alcoholic silicates said basic component being one or more suitable bases selected from the group consisting of organic and inorganic salt-forming bases having a pKb of less than about 13.5; and said acid-releasing component being one or more substantially neutral compounds selected from the group consisting of organic compounds which release a strong acid under solvolytic conditions at a rate in the range of from about 10^{-3} to 10^{-6} equivalent of the acid per liter per minute at said temperature.

4,015,996

AMORPHOUS PRECIPITATED SILICEOUS PIGMENTS

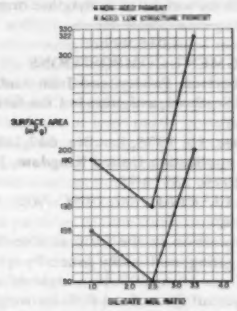
Satish K. Wason, Churchville, Md., assignor to J. M. Huber Corporation, Locust, N.J.

Continuation-in-part of Ser. No. 519,720, Oct. 31, 1974, which is a continuation-in-part of Ser. No. 286,655, Sept. 6, 1974, Pat. No. 3,893,840. This application Apr. 2, 1975, Ser. No. 564,255

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C09C *1/30*

U.S. Cl. 106—288 **2 Claims**



1. A new composition of matter comprising an amorphous, finely divided precipitated silica pigment having a wet cake moisture content of less than 70 percent; an oil absorption on the order of less than 125 cc/100 gm; pack densities of greater than 12 pounds/cu. ft.; a valley abrasion of greater than 5.0 mg. wire loss; a surface area in the range of from 100 to 300 m^2/gm; and a refractive index of greater than 1.445, said silica having intimately admixed and associated therewith a metal cation selected from the group consisting of aluminum, magnesium, calcium and zinc, said cation being present in an amount of up to 10 percent by weight based on the total weight of said silica and serving to control the refractive index such that same is greater than 1.445 and serving to control the surface area such that same is in the range of from about 100 to 300 m^2/gm.

4,015,997

PROCESS FOR STABILIZING AQUEOUS COAL SLUDGES

Joseph G. Selmeczi; Donald H. Marlin, both of Pittsburgh, and Daniel W. Kestner, Coraopolis, all of Pa., assignors to Dravo Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 339,151, March 8, 1973, Pat. No. 3,920,795. This application July 22, 1975, Ser. No. 598,117

The portion of the term of this patent subsequent to Nov. 18, 1992, has been disclaimed.

Int. Cl.² C08K *11/00*

U.S. Cl. 106—287 R **5 Claims**

1. A process for converting an aqueous coal processing waste sludge, containing finely divided coal particles and waste materials from the beneficiation of coal, into a sedentary mass of improved load supportive properties comprising:

a. providing a concentrated aqueous coal processing waste sludge having a solids content in the range of 20–80 weight percent solids;

b. adding to the concentrated sludge between 2–50 percent by weight, based on the weight of said solids, of granulated blast furnace slag;

c. intimately mixing the combined concentrated sludge and granulated blast furnace slag; and

d. maintaining the resulting mixture in a substantially quiescent stage and in the presence of excess water to produce a sedentary mass.

4,015,998
2,9-DICHLOROQUINACRIDONE PIGMENT COMPOSITIONS
Edward Ephraim Jaffe, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Sept. 24, 1975, Ser. No. 616,378
Int. Cl.² C09B *48/00*
U.S. Cl. 106—288 Q **5 Claims**

1. Pigmentary 2,9-dichloroquinacridone characterized by 20 values of its X-ray powder diffraction pattern having a strong band at 27.8°, medium bands at 5.3°, 15.2° and 23.2° and weak bands at 14.0°, 16.5°, 19.2°, 21.3° and 22.8°.

2. Pigmentary composition containing from 50 to 3% by weight of the 2,9-dichloroquinacridone of claim 1 in combination with 50 to 97% by weight of molybdate orange.

4,015,999
PIGMENT COMPOSITIONS
George Heddle Robertson, Paisley, and John Andrew Stirling, Glasgow, both of Scotland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed Dec. 19, 1975, Ser. No. 642,268
Claims priority, application United Kingdom, Jan. 8, 1975, 729/75; May 30, 1975, 23570/75
Int. Cl.² C08J *3/00;* **C09C** *1/00*
U.S. Cl. 106—308 Q **9 Claims**

1. Pigment composition in the form of free-flowing, non-dusting, non-aggregating, non-sticky generally spherical beads which comprises from 40 to 80% by weight of a pigment or water-insoluble dyestuff from 5 to 40% by weight of a normally solid water-insoluble organic compound carrier or mixture of carriers melting below 100° C, from 2.5 to 25% of an organic acid having at least 8 carbon atoms and from 1.5 to 25% of an organic base having at least 8 carbon atoms, the amount of acid plus base being from 5 to 35% by weight of the total composition, and wherein said beads have a particle size of from 0.5 to 5 mm diameter.

4,016,000
ORGANOSILICONE POLYMER SOLUTIONS
Bela Prokai, Mahopac, and Bernard Kanner, West Nyack, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.
Division of Ser. No. 420,233, Nov. 29, 1973, Pat. No. 3,887,500, which is a division of Ser. No. 279,883, Aug. 11, 1972, Pat. No. 3,846,462. This application Sept. 6, 1974, Ser. No. 503,776
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.
Int. Cl.² C08K *5/06;* **C08L** *75/08, 83/12*
U.S. Cl. 106—316 **5 Claims**

1. Solution compositions comprising polymer Component (A) and solvent Component (B), said Component (A) being present in an amount from about 25 to about 80 parts by weight per 100 parts by weight of the total weight of (A) and (B), where:

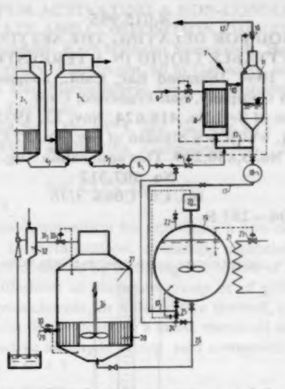
Component (A) is an organosilicone polymer having the average formula,

$$R_3SiO[R_2SiO]_x[\underset{\displaystyle R'CN}{RSiO}]_y[\underset{\displaystyle R''_p(OC_2H_4)_n(OC_3H_6)_mOW}{RSiO}]_zSiR_3$$

wherein: R is an alkyl group having from 1 to 10 carbon atoms; R' is a bivalent alkylene or a bivalent oxyalkylene group the oxygen atom of which is bonded to silicon; R'' is an organic radical comprising a bivalent alkylene radical a carbon atom of which is bonded to silicon; W comprises a monovalent hydrocarbyl group having from 1 to 12 carbon atoms; p has a value of zero or one; x has an average value of from about 10 to about 200; y has an average value of from 3 to about 100; z has an average value of from about 2 to about 30; and m and n are numbers such that the average molecular weight of the chain, $-(C_3H_6O)_m(C_2H_4O)_n-$, is from about 1,000 to about 6,000 and from about 20 to about 65 weight per cent of the chain is constituted of oxyethylene units; and

Component (B) is an alkylene oxide adduct of butanol having the formula $C_4H_9(OC_3H_6)_u(OC_2H_4)_sOH$, wherein the average value of s is from about 8 to about 50 and the average value of u is from about 6 to about 40.

4,016,001
METHOD AND DEVICE FOR OBTAINING SUGAR CRYSTALS FROM A SUGAR SOLUTION
Dirk Hoks, Hengelo, Netherlands, assignors to Stork Werkspoor Sugar B.V., Hengelo and Suiker Unie Holding B.V., Rotterdam, both of Netherlands
Filed June 13, 1975, Ser. No. 586,658
Claims priority, application Netherlands, June 14, 1974, 7408016
Int. Cl.² C13F *1/00, 1/02*
U.S. Cl. 127—16 **20 Claims**



13. In a system for obtaining sugar crystal from a sugar solution which includes a multi-stage evaporator and a boiling pan, the improvement which comprises:

a preconcentrator including supply means connecting said preconcentrator to a last stage of the multi-stage evaporator for supplying sugar solution of predetermined concentration to the preconcentrator, means for supplying heat to the preconcentrator and means for withdrawing steam from the sugar solution in the preconcentrator at a rate sufficient to maintain the pressure within the preconcentrator at less than atmospheric pressure whereby the concentration of the sugar solution within the preconcentrator is increased to a value at which seed crystals could be added to such solution if it were directly introduced into said boiling pan;

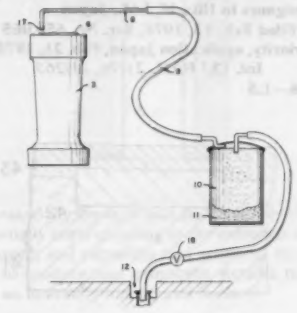
a holding vessel and supply means connecting said preconcentrator to the holding vessel for feeding sugar solution to said holding vessel, conduit means connnecting said holding vessel to the boling pan and including normally closed valve means for allowing sugar solution to accumulate in said holding vessel whereafter it is delivered batchwise to the boiling pan, agitating means for continuously stirring the contents of said holding vessel, means for maintaining a pressure within said holding vessel sufficiently higher than that in said preconcentrator as to prevent further concentration of said sugar solution in the holding vessel; and

said boiling pan including means for withdrawing steam therefrom at a rate sufficient to maintain the pressure in the boiling pan lower than atmospheric pressure and lower than that in said holding vessel, condenser means for condensing the steam issuing from said boiling pan, and means for supplying heat to said boiler pan.

4,016,002
METHOD FOR REMOVING HEAT-INSULATING MATERIAL FROM AN INGOT MOLD BEFORE THE REMOVAL OF THE INGOT

Hannes Vallak, Geneva, Switzerland, assignor to Enn Vallak, Geneva, Switzerland

Continuation-in-part of Ser. No. 450,430, March 12, 1974, abandoned. This application Nov. 11, 1975, Ser. No. 630,788
Claims priority, application Sweden, Mar. 20, 1973, 7303892
Int. Cl.² B08B *5/04*
U.S. Cl. 134—6 **6 Claims**



1. A method for removing heat-insulating material, at least some of which is frangibly caked, from a partially cooled ingot mold containing a relatively hot ingot before removal of the hot ingot from the mold, comprising the steps of:

a. providing a low-pressure vacuum;

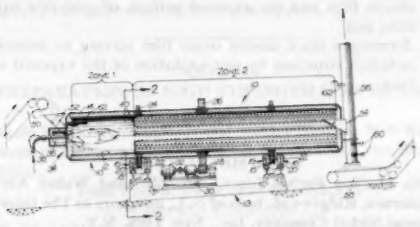
b. conducting said low-pressure vacuum through a rigid, manipulatable, heat-resistant conduit; and

c. simultaneously fragmentizing portions of the caked heat-insulating material with, and applying the low-pressure vacuum through, said rigid conduit for removing the material from the mold.

4,016,003
BENEFICIATION OF METAL SCRAP

William O. Stauffer, Moraga, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Jan. 23, 1976, Ser. No. 651,999
Int. Cl.² B08B *7/00*
U.S. Cl. 134—19 **17 Claims**



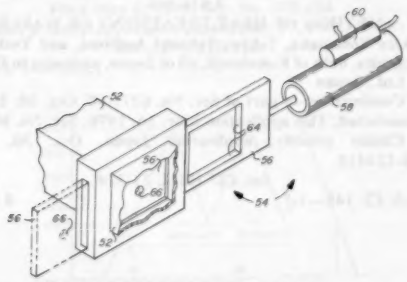
1. An apparatus for use in beneficiating relatively small shredded aluminous metal particles or the like covered with volatilizable materials comprising the combination of a somewhat inclined and rotatable roaster-type device, means for rotating said roaster-type device at selected speeds, said roaster-type device being provided with a metal particle entry end and a metal particle exit end, flame means for selectively heating said roaster-type device at the metal particle entry end thereof, means for introducing the metal particles into the said metal particle entry end of the roaster-type device and off to the one side of and below said flame means so as to avoid direct flame and particle contact, a plurality of rows of toothed flight elements radially mounted within said roaster-type device, said flight elements commencing a selected distance downstream from the material entry end of the roaster-type device and extending along the length of the roaster-type device for a major portion of the said length, said flight elements being adapted to contact and effect a separation of the metal particles one from another as well as a distribution of the metal particles cross-wise of the device and tumbling and cascading movements of the metal particles initially at points remote from the said metal particles entry end during passage of the metal particles through the roaster-type device so as to effect substantially full exposure of the volatile covered surfaces of the metal particles to the heat of the roaster-type device but without direct flame and particle contact, and means for recovering the beneficiated metal particles at the exit end of the roaster-type device.

10. A process for beneficiating shredded aluminous scrap metal particles of irregular shapes the exposed surfaces of certain of which are at least partly covered with volatilizable materials, comprising the steps of introducing said particles into the bottom area of a heated particle receiving zone while avoiding direct contact between the heat producing medium utilized to heat the said zone and the scrap metal particles, allowing said particles to flow freely downward into an adjoining and second heated zone located in open communication with said first zone and while distributing said particles substantially evenly across various portions of said second zone causing the particles to pass through said second zone in the form of cascading streams of repeatedly tumbled particles so as to effect maximum exposure of substantially all outer surfaces of the particles covered with volatilizable materials to the heat of the said zones and a volatilization of the volatilizable materials clinging thereto and during passage of the particles throughout all of the said zones maintaining the elevated temperatures of said zones below the ignition point of the volatilizable materials.

4,016,004
TRASH COLLECTING SYSTEM FOR OPEN-END SPINNING MACHINE

Ernest Koella, III, Rockford, Tenn., assignor to Platt Saco Lowell Limited, England

Filed June 25, 1975, Ser. No. 590,368
Int. Cl.² B08B *5/04*; D01H *11/00*
U.S. Cl. 134—21 **24 Claims**



1. In combination with an open-end spinning machine including a trash box having a trash-inlet opening and a trash-outlet opening therein, an improved method for collecting trash introduced into said box through said inlet, comprising:

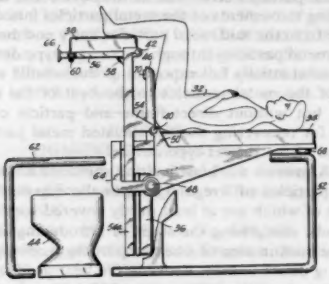
intermittently evacuating, at successive periodic times, trash from said box through said outlet;

and at other times applying to trash within said box a suction force adapted and effective to then retain the trash within said box and discourage possible reverse-passage of the trash through said inlet.

4,016,005
METHOD OF TRANSFERRING A PERSON FROM A RECLINED POSITION TO A SEATED POSITION

Paul L. DiMatteo, Huntington, N.Y., assignor to Dynell Electronics Corporation, Melville, N.Y.

Filed Jan. 28, 1975, Ser. No. 544,710
Int. Cl.² A61G 7/02, 7/10; B08B 3/02
U.S. Cl. 134—30 23 Claims



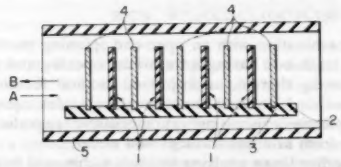
1. A method for placing a person onto a toilet from a reclined position comprising the sequentially taken steps of: supporting the back side of the person; moving the calves and thighs of the person in a direction toward the front side of the upper part of the person's body; bending said person's knees; uncovering substantially the posterior of said person, at least part of the weight of said person being directed away from said posterior during uncovering of said posterior; moving a toilet seat in contact with the posterior of said person independent of the toilet, said toilet being stationary when moving said toilet seat; moving said person to an upright seated position; and placing said person over the toilet in seated position with the lower part of the legs directed downwardly, the upper surface of said toilet seat contacting directly the posterior of said person when seated over said toilet, the backside of said person being supported while said person is moved to the seated position.

4. The method as defined in claim 1 including the steps of cleansing the posterior of said person with a fluid and drying thereafter the posterior of said person prior to returning the person to the reclined position.

4,016,006
METHOD OF HEAT TREATMENT OF WAFERS

Akira Yoshinaka, Tokyo; Takaaki Aoshima, and Yoshimitsu Sugita, both of Kokubunji, all of Japan, assignors to Hitachi, Ltd., Japan

Continuation-in-part of Ser. No. 627,368, Oct. 30, 1975, abandoned. This application Mar. 16, 1976, Ser. No. 667,452
Claims priority, application Japan, Oct. 30, 1974, 49-124415
Int. Cl.² H01L 21/324
U.S. Cl. 148—1.5 8 Claims

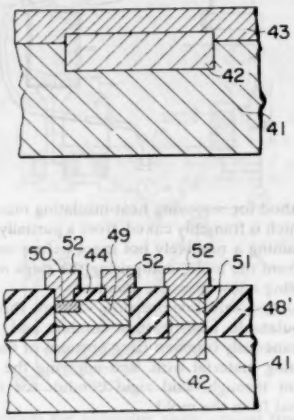


1. In a method of heat-treating a number of wafers each of which consists of a substance of poor heat conduction and a semiconductor layer formed on one surface thereof, said method of heat treatment of wafers comprising the fact that the treatment is performed under the state under which an auxiliary wafer made of a substance of good heat conduction is held in proximity to that surface of said substance of poor heat conduction which is opposite to said one surface.

4,016,007
METHOD FOR FABRICATING A SILICON DEVICE UTILIZING ION-IMPLANTATION AND SELECTIVE OXIDATION

Yasuo Wada, Tokyo; Hiroo Usui, Machida; Mitsumasa Koyanagi, Kokubunji, and Mikio Ashikawa, Koganei, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 13, 1976, Ser. No. 658,065
Claims priority, application Japan, Feb. 21, 1975, 50-21008
Int. Cl.² H01L 21/76, 21/265
U.S. Cl. 148—1.5 9 Claims



1. A method for fabricating a semiconductor silicon device comprising:
1. growing an thin silicon oxide film by thermal oxidation on a surface of a monocrystal silicon substrate;
2. forming a polycrystalline silicon film at at least one predetermined location on said thin oxide film;
3. implanting nitrogen ions at a dose level greater than 1×10^{15} cm^{-2} in the outer surface of said polycrystalline silicon film and the exposed surface of said thin oxide film; and
4. forming a thick silicon oxide film serving as dielectric isolation structure by wet oxidation of the exposed surfaces.

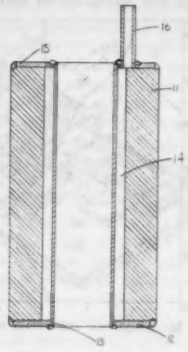
4,016,008
CLAD METAL TUBES

Robin Mackay Forbes Jones, Titusville, and Walter Adrian Petersen, Ridgewood, both of N.J., assignors to The International Nickel Company, Inc., New York, N.Y.

Filed July 31, 1975, Ser. No. 600,613
Int. Cl.² B22F 7/04
U.S. Cl. 138—140 18 Claims

1. A process for preparing a composite metallic tubular member having an internally-lined metal surface comprising: preparing a metal shell having concentric inner and outer surfaces; attaching to said metal shell a first end closure plate and a metal inner liner so that said metal shell and said metal inner liner are concentrically aligned, thereby forming an annular space; pouring a pre-alloyed, argon atomized metal powder into said annular space between said metal shell and

said metal inner liner; attaching to said metal shell and said metal inner liner a second end closure plate thereby enclosing said annular space containing said metal powder and completing an assembly; heating said assembly for a time period sufficient to substantially through-heat said assembly to a temperature substantially corresponding to the extrusion temperature to be employed; and extruding said assembly through an extrusion die to produce said composite metallic tubular member having an internally-lined metal surface.



4,016,009

PRODUCING ROLLED STEEL PRODUCTS

Mario Economopoulos, Liege, and Yves Jean Respen, Herstal, both of Belgium, assignors to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie, Brussels, Belgium

Filed Jan. 29, 1976, Ser. No. 653,607

Claims priority, application Belgium, Jan. 29, 1975, 824960; Feb. 28, 1975, 826201

Int. Cl.² C21D 9/52

U.S. Cl. 148—12 B **10 Claims**

1. A method of producing a rolled steel product in a rolling mill including finishing stands, the method comprising the steps of reducing the temperature of the product, before it enters the finishing stands, to a value between Ac_3 and Ac_3 + 150° C; quenching the product emerging from the finishing stands, thereby forming a quenched surface comprising martensite and/or bainite, the product still having an unquenched core; and allowing heat from the core to raise the temperature of the quenched surface to a value between 450° and 750° C, whereby the quenched surface is tempered.

4,016,010

PREPARATION OF HIGH STRENGTH COPPER BASE ALLOY

Ronald N. Caron, Branford, and Stanley Shapiro, New Haven, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Feb. 6, 1976, Ser. No. 655,791

Int. Cl.² C22F 1/08

U.S. Cl. 148—12.7 C **13 Claims**

1. A method for obtaining a spinodal, precipitation hardened copper base alloy having high strength and favorable strength to ductility characteristics which comprises:

A. providing a copper base alloy consisting essentially of from 10 to 30% nickel, from 1 to 5% aluminum, balance copper;

B. hot working said alloy with a finishing temperature in excess of 400° C;

C. solution annealing said alloy for from 10 seconds to 24 hours at a temperature of from 650° to 1100° C; and

D. cooling the alloy to room temperature to provide a spinodal, precipitation hardened copper base alloy wherein the microstructure is characterized by the presence of finely dispersed precipitates of Ni_3Al particles dispersed throughout the matrix.

4,016,011

METHOD FOR HEAT TREATMENT OF HIGH ALLOY STEEL IN A NONEXPLOSIVE ATMOSPHERE

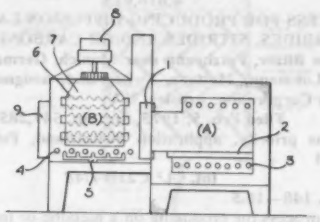
Takeji Asai, and Kaishu Yamazumi, both of Toyama, Japan, assignors to Kabushiki Kaisha Fujikoshi, Japan

Filed Sept. 10, 1975, Ser. No. 612,222

Claims priority, application Japan, Apr. 2, 1975, 50-40520

Int. Cl.² C21D 1/48

U.S. Cl. 148—16 **5 Claims**



1. A high temperature method for heat treatment of a high alloy steel article comprising the steps of:

mixing nitrogen gas with a liquid organic compound having at least one oxygen atom;

heating the mixture until said liquid organic compound is caused to crack whereby a nonexplosive, neutral or weak reducing atmosphere of 0.5 to 1.5 percent carbon monoxide by volume, 0.5 to 2.5 percent hydrogen by volume, a minute quantity of activated carbon and the remainder being nitrogen is created;

subjecting said article to said atmosphere; and

heating said article to a high temperature in said atmosphere.

4,016,012

METHOD FOR SURFACE TREATMENT OF METALLIC MATERIALS

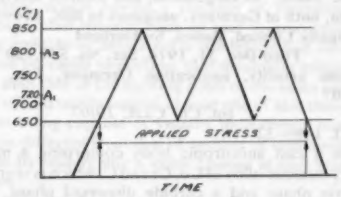
Yoshiki Oshida, Yokohama, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 8, 1975, Ser. No. 575,694

Claims priority, application Japan, June 17, 1974, 49-68112

Int. Cl.² C21D 1/48

U.S. Cl. 148—16.5 **1 Claim**



1. A method for carburization of soft steel with a surface treatment agent to diffuse carbon into the soft steel, that is characterized as having at least two phase transformation temperatures, comprising

placing the surface treatment agent which is selected from the group consisting of CO, carbon and carbon admixed with $BaCO_3$ and the soft steel in a treating device;

heating said soft steel and surface treatment agent over a temperature cycle, wherein the minimum temperature of

said cycle is below the lower of said two phase transformation temperatures and the maximum temperature of said cycle exceeds the higher of said two phase transformation temperatures, wherein said heating over said cycle is undertaken alternately and repeatedly and is continuous between said minimum and maximum temperature as indicated by the broken line in FIG. 1 in the drawing; and

applying a stress to said agent and soft steel, said stress ranging from 0 to 2 kg/mm², when the material is heated to the lower limit temperature and releasing said stress at the end of one of said cycles at the minimum temperature, to effect carburization of the soft steel.

4,016,013
PROCESS FOR PRODUCING DIFFUSION LAYERS OF CARBIDES, NITRIDES AND/OR CARBONITRIDES

Diethelm Bitzer, Putzbrunn near Munich, Germany, and Dieter Lohmann, Muttenz, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 5, 1975, Ser. No. 547,285

Claims priority, application Switzerland, Feb. 7, 1974, 1702/74

Int. Cl.² C21D *1/48*

U.S. Cl. 148—16.5 **9 Claims**

1. A process for producing on a metallic or metalloid substrate, which consists at least partially of one or more of the elements selected from the group consisting of iron, boron, silicon and the transition metals of sub-groups 4 to 6 of the periodic table, a diffusion layer of material selected from the group consisting of said metal carbide, nitride and carbonitride which comprises

heating said substrate to a temperature of 500° C. to 1800° C., and

contacting said substrate with a gaseous or vaporous reactant stream comprising a carrier gas selected from argon and hydrogen and at least one carbon — and nitrogen — releasing compound which readily decomposes at substrate temperature, said compound selected from the group consisting of cyanuric chloride, 2,4-dichloro-6-diisopropylamino-s-triazine, 2-chloro-4,6-bis(diethylamino)-s-triazine, 2,4-bis(diethylamino)-6-dimethylamino-s-triazine, 2,4,5,6-tetrachloropyrimidine, 2,4,6-tris(diethylamino)-s-triazine, 2,4-bis(dimethylamino)-6(1-methylhydrazino)-s-triazine, 2,6-bis(-dimethylamino)-5-(cyanopyrimidine and 2,4-dichloro-6-(diallylamino)-s-triazine, permitting reaction thereof to form said diffusion layer on said substrate.

4,016,014
HIGH TEMPERATURE ALLOY

Peter R. Sahm, Neckargemund, and Andrew R. Nicoll, Oftersheim, both of Germany, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Dec. 31, 1974, Ser. No. 537,720

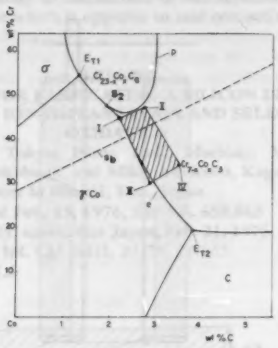
Claims priority, application Germany, Feb. 11, 1974, 2406407

Int. Cl.² C22C *19/07*

U.S. Cl. 148—32 **10 Claims**

1. In a cast anisotropic body comprising a monovariant ternary eutectic alloy of Co, Cr and C, which is segregated into a matrix phase and a carbide dispersed phase, the matrix phase consisting essentially of a Co-Cr solid solution and the dispersed phase consisting essentially of a plurality of high strength carbide fibers predominantly of the Cr_7C_3 type oriented in substantial alignment, and integrally embedded in the matrix phase, the improvement which comprises:

replacing a portion of the Co, Cr and/or carbon in the matrix and/or dispersed phases of said alloy with nickel in an amount of 1.5 weight % to 8.5 weight % based on the total weight of the composition, with the proviso that the composition contains at least 1.5 weight % carbon, wherein the final composition of said eutectic alloy is



defined by that region of the Co, Cr, C phase diagram of FIG. 1 defined by the following boundaries:

	Co,Ni =	Cr,Ni =	C,Ni =
1.	53.1%	44.7%	2.2%
2.	50.25%	47%	2.75
3.	67.15%	30%	2.85%
4.	62.5%	34%	3.5%

4,016,015
ROLLED STEEL ROD OR BAR

Yves Jean Respen, Herstal; Paul Andre Cosse, Bellaire, and Mario Economopoulos, Liege, all of Belgium, assignors to Centre de Recherches Metallurgiques-Centrium voor Research in de Metallurgie, Brussels, Belgium

Division of Ser. No. 411,227, Oct. 31, 1973, Pat. No. 3,926,689. This application Sept. 26, 1975, Ser. No. 617,156

Claims priority, application Belgium, Oct. 31, 1972, 790867

The portion of the term of this patent subsequent to Dec. 16, 1992, has been disclaimed.

Int. Cl.² C22C *35/00*

U.S. Cl. 148—39 **5 Claims**

1. Rolled steel rod or bar having a surface layer composed of bainite or martensite, and a core composed of ferrite and carbides, the rod or bar having been produced in a hot rolling mill by a process comprising: superficially quenching the rod or bar at the exit of a finishing stand, to transform austenite in the surface layer of the rod or bar to bainite or martensite, with the core of the rod or bar remaining austenite; and subsequently cooling the rod or bar at such a rate that the core of austenite transforms to ferrite and carbides while the surface layer is tempered by heat transferred from the core.

4,016,016
METHOD OF SIMULTANEOUSLY FORMING A POLYCRYSTALLINE SILICON GATE AND A SINGLE CRYSTAL EXTENSION OF SAID GATE IN SILICON ON SAPPHIRE MOS DEVICES

Alfred Charles Ipri, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 22, 1975, Ser. No. 579,967

Int. Cl.² H01L *21/203, 21/84, 29/78*

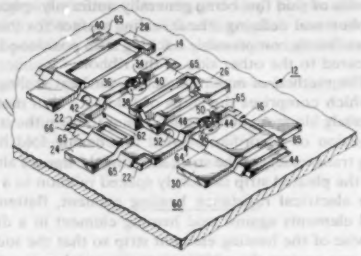
U.S. Cl. 148—175 **6 Claims**

1. In a method for manufacture of an integrated circuit comprised of devices comprising silicon mesas adjacent a single crystal insulating substrate, the circuit having a connecting strip, the strip extending from the substrate and merging into a conductive layer above the mesa, the improvement comprising making the connecting strip by the steps of:

a. depositing a polycrystalline silicon layer above at least

one mesa onto a layer of a noncrystalline material adjacent the mesa from a silicon source evaporated at a temperature between 900° C and 1,200° C;

b. simultaneously depositing a single crystal silicon layer onto the substrate from the same silicon source evaporated at the same temperature, the substrate having an



exposed surface oriented for epitaxial growth of silicon thereon; and

c. selectively removing portions of the deposited polycrystalline silicon layer and the single crystal layer whereby the polycrystalline silicon layer is shaped to comprise a gate above said mesa and the single crystalline silicon layer is shaped to comprise said connecting strip.

4,016,017

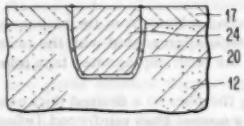
INTEGRATED CIRCUIT ISOLATION STRUCTURE AND METHOD FOR PRODUCING THE ISOLATION STRUCTURE

Joseph Adam Aboaf, Peekskill; Robert Wallace Broadie, Hopewell Junction, and William Aaron Pliskin, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 28, 1975, Ser. No. 636,243

Int. Cl.² H01L *21/316*

U.S. Cl. 148—187 **13 Claims**



1. A method of producing a semiconductor device comprising:

forming porous silicon regions in a semiconductor body;

oxidizing said porous silicon regions at a temperature sufficient to completely oxidize said porous silicon regions and so that the oxidized porous silicon extends above the surface of the said body; and

subjecting the said oxidized porous silicon regions to a temperature higher than said oxidizing temperature to cause the densification of said oxidized porous silicon regions which result in their being substantially planar with the surface of the semiconductor body.

4,016,018

METHOD OF PREPARING PRIMING EXPLOSIVES

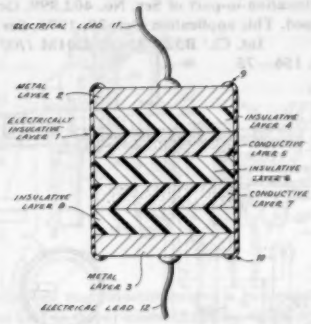
Michel Pierre Alphonse Lenôtre, Tarbes, France, assignor to Etat Francais, Paris, France

Continuation-in-part of Ser. No. 100,428, Dec. 21, 1970, abandoned. This application Aug. 13, 1973, Ser. No. 387,812

Claims priority, application France, Dec. 22, 1969, 69.44313

Int. Cl.² C06B *45/04, 45/10, 45/08, 35/00*

U.S. Cl. 149—17 **8 Claims**



1. A method for the preparation of explosive priming compositions which are water-resistent comprising the following steps: forming an aqueous dispersion of (a) lead azide as a primary explosive having a particle size less than 5 microns (b) a polymerizable plastic material which is non-elastomeric and insoluble in water and is selected from the group consisting of a phenolic resin, a polyester, a polyamide, and vinyl copolymers, and (c) a plasticizer; said aqueous dispersion rendering the primary explosive substantially explosively insensitive to mechanical and electrical action; mechanically and vigorously agitating the aqueous dispersion; separating, by filtration, a liquid phase from a solid phase; mechanically working the material of the solid phase; and effecting final polymerization thereof whereby a final product is obtained in which the primary explosive regains its explosive sensitivity.

4,016,019

INTEGRATED INDICATOR SYSTEM FOR SOLVENT REMOVAL

Alan H. Norris, Rome, Ga., assignor to Champion International Corporation, Stamford, Conn.

Filed Oct. 1, 1975, Ser. No. 618,611

Int. Cl.² F26B *21/10*

U.S. Cl. 156—64 **8 Claims**

1. A textile article having a plurality of thermosensitive fibers incorporated therein, each of said thermosensitive fibers being capable of indicating a predetermined maximum temperature by visual inspection, said maximum temperature being less than that of the melting point of the main construction fibers of said textile article, at least one of said thermosensitive fibers being capable of visually indicating a maximum temperature different from that of another of said thermosensitive fibers by undergoing a color change at said maximum temperature.

3. A method for the removal of a volatile organic solvent from a tufted textile article that is wetted with said solvent, which method comprises providing said tufted textile article with a plurality of thermosensitive fibers, each of said fibers being capable of visually indicating a predetermined maximum temperature, at least one of said fibers being capable of visually indicating a temperature substantially corresponding to the boiling point of said volatile solvent, other thermosensitive fibers being capable of visually indicating temperatures below and above the boiling point of said volatile solvent, and

heating said textile article to a temperature at which said thermosensitive fibers indicate that the temperature of said textile article is substantially that corresponding to the temperature at which the volatile solvent evaporates.

4,016,020

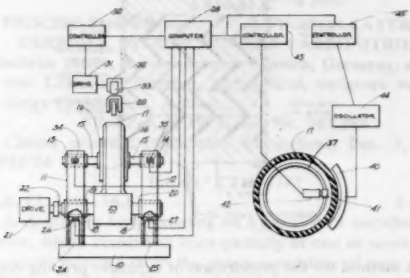
SYSTEM FOR MEASURING AND CORRECTING VIBRATIONS GENERATED IN VEHICULAR TIRES

Theodore Ongaro, Columbus, Ohio, assignor to Ongaro Dynamics Incorporated, Columbus, Ohio

Continuation-in-part of Ser. No. 402,899, Oct. 3, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 623,639

Int. Cl.² B32B *35/00*; **G01M** *1/00*

U.S. Cl. 156—75 **19 Claims**



1. A method of correcting a rubber tire for vibration producing forces generated in the tire when operated under load and at cruising speed, which comprises the steps of:

revolving the tire at a cruising speed equal to from 50–90 m.p.h. under a load simulating the weight load supported by the tire in normal use to develop centrifugally generated forces in the tire,

measuring the magnitudes and locations of the centrifugally generated forces developed in the revolving tire, said measured forces comprising (a) forces generated by peripheral non-uniformities, and (b) forces developed by lack of tire symmetry, and

correcting the tire for both the (a) and (b) forces in two stages, the first stage comprising correction for the (a) forces by removing rubber from the periphery of the tire in accordance with the magnitude and location of the non-uniformities while the tire is rotating at cruising speed, and the second stage comprising correction for the (b) forces by selectively adding to or removing rubber from the tire in the areas at or adjacent the tire beads in accordance with the magnitude and location of the (b) forces.

4,016,021

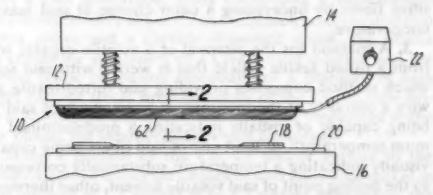
HEAT SEALING UNIT AND METHOD OF MAKING SAME

Lee La Fleur, 273 River St., Manistee, Mich. 49660

Filed Mar. 29, 1976, Ser. No. 671,580

Int. Cl.² B30B *15/34*; **B32B** *31/00*; **H05B** *3/34*

U.S. Cl. 156—154 **23 Claims**



1. A device for heat sealing plastic films comprising an electrical resistance heating unit in the form of an elongated flexible ribbon, a plurality of thin metal fins extending outwardly from one side of the ribbon, means securing the inner ends of said fins to said ribbon so that the individual fins extend transversely of the ribbon in closely spaced relation, all of said fins being flattened in a direction lengthwise of and against the ribbon in overlapping contacting relation, the outer ends of said fins being generally uniformly spaced from said ribbon and defining a heat sealing surface for the device and a resiliently compressible backing strip positioned against and secured to the other side of the ribbon.

21. The method of making a device for heat sealing plastic films which comprises the steps of folding a thin metal strip transversely along regularly spaced lines to form the strip into a succession of accordian-pleated fins having fold lines extending transversely of the strip, securing the apexes along one side of the pleated strip in closely spaced relation to a strip of flexible electrical resistance heating element, flattening the pleated elements against said heating element in a direction lengthwise of the heating element strip so that the successive fins lie one against the next in partially overlapping relation, mounting said heating element strip with the fins thereon on a relatively rigid backing member and thereafter removing the outer end portions of the fins from the pleated strip along a line generally parallel to the backing member.

4,016,022

LOW FLOW, VACUUM BAG CURABLE PREPREG MATERIAL FOR HIGH PERFORMANCE COMPOSITE SYSTEMS

Charles E. Browning, and Theodore J. Reinhart, Jr., both of Dayton, Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 30, 1975, Ser. No. 645,154

Int. Cl.² B29C *17/00*

U.S. Cl. 156—285 **13 Claims**

1. A method for fabricating a composite panel which comprises the following steps:

a. mixing in a common solvent 100 parts by weight of a carboxy terminated vinyl polybutadiene and 100 to 150 parts by weight of an epoxy novolak resin with 2.5 to 2.6 parts by weight of chromium octoate;

b. refluxing the resulting solution for a period of about 0.25 to 3 hours;

c. at the end of the reflux period, cooling the solution to room temperature;

d. adding to the cooled solution 8 to 10 parts by weight of 2,5-dimethyl-2,5-di(t-butylperoxy)hexane and 1 to 5 parts by weight of benzyldimethylamine;

e. stirring the solution containing the added materials, thereby obtaining a resin solution;

f. coating the resin solution on a tape formed of reinforcing fibers;

g. evaporating solvent from the resin solution, thereby obtaining tape impregnated with the resin;

h. cutting the resin impregnated tape into plies of a desired size;

i. stacking the plies to a desired thickness;

j. placing a porous glass reinforced Teflon coated fabric on the top and bottom of the stack of plies;

k. laying a breather cloth above and below the Teflon coated fabric;

l. positioning the resulting assembly on a base plate and installing a vacuum bag thereover sealed to the base plate;

m. evacuating air from the bag down to about 28 to 30 inches of mercury;

n. placing the assembly in an air circulating oven;

o. raising the temperature in the oven from room temperature to about 325° to 375° F at a rate of 3° to 7° F per minute; and

p. maintaining the assembly at a temperature in the afore-

mentioned range for a period of 0.75 to 1.5 hours, thereby obtaining a cured composite panel, the amount of resin in the panel being substantially equal to the amount of resin in the stacked plies.

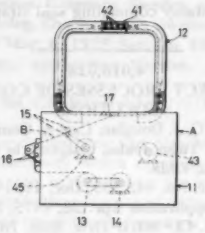
5. A prepreg material consisting essentially of the following components:

a. the reaction product obtained by reaction 100 parts by weight of a carboxy terminated vinyl polybutadiene and 100 to 150 parts by weight of an epoxy novolak resin in the presence of 2.5 to 2.6 parts by weight of chromium octoate;
b. zero to 20 parts by weight of bis(4-maleimidophenyl)methane;
c. 8 to 10 parts by weight of 2,5-dimethyl-2,5-di(t-butylperoxy)hexane; and
d. 1 to 5 parts by weight of epoxy catalyst.

4,016,023
APPARATUS FOR AUTOMATICALLY BINDING PACKAGE

Masaho Takami, No. 9-50, Yamanote-cho, Korien Hirakata, Osaka, Japan

Filed July 16, 1975, Ser. No. 596,567
Claims priority, application Japan, July 18, 1974, 49-87137; Dec. 28, 1974, 50-2936; Mar. 13, 1975, 50-32571
Int. Cl.² B65B *13/32*
U.S. Cl. 156—359 **5 Claims**



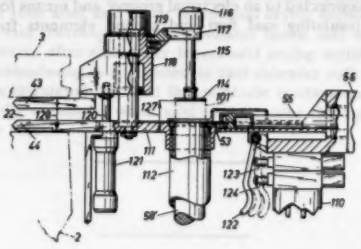
1. A package taping machine comprising:

a. a case (**11**) with a top for resting a package thereon and having openings at the top, a tape guide channel (**12**) over said opening to guide a tape around a package;
b. a tape table (**17**) slidable in the case below said opening;
c. a tape pay-off reel (**13**) in the case for feeding a thermoplastic tape up through said opening and around a package on the case and then through the opening below said table again;
d. a first clamping element (**18**) elevatable towards the table so as to hold the end portion of the tape against said table;
e. a second clamping element (**23**) elevatable towards said table so as to hold the overlapping portions of the tape against said table;
f. a rockable tape guide element supporting a vertically slidable tape cutting heater;
g. a pressing element (**22**) elevatable towards said table so as to press the overlapping portions of the tape against said table;
h. time control cams coupled to said first clamping element, tape guide elements, pressing element and second clamping element, all said elements being aligned successively in the lengthwise direction of the tape, said time control cams adapted to elevate said elements by direct contact with said elements in timed relation with each other;
i. a welding heater (**25**) adapted to be transversally inserted between the overlapping portions of the tape to be pressed against the table by said pressing element; and,
j. a bimetal element temperature control connected to said welding heater for controlling its heating temperature.

4,016,024
MACHINE TO ARRANGE A NOISE INSULATION BETWEEN TWO CONCRETE ELEMENTS

Lars-Erik Karlsson, Kallered, Sweden, assignor to Nilcon Engineering AB, Kallered, Sweden

Filed Dec. 10, 1974, Ser. No. 531,224
Claims priority, application Sweden, Dec. 14, 1973, 7316899; Oct. 21, 1974, 7413207
Int. Cl.² B32B *31/12*; G01B *5/14*
U.S. Cl. 156—378 **15 Claims**

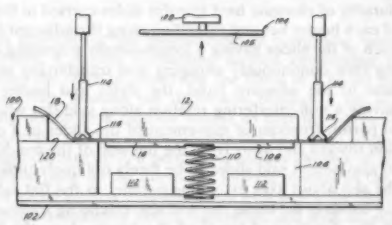


1. In an improved machine comprising a bed supporting a lower element and an upper element resting thereon, a number of lifting means, abutment means cooperating with said lifting means, a supply of resilient sound-insulating material, said lifting means arranged to raise said upper element into contact with said abutment means so as to form between said upper and said lower elements a gap having a height of a predetermined value, said predetermind value exceeding the height of one layer of said sound-insulating resilient material to be introduced into said gap, the improvement comprising a stand vertically movable adjacent said elements, said stand including a setting device insertable into said gap to sense the height thereof and adapted to set said stand vertically in dependence on the height of said gap, a stop abutment, said stop abutment being associated with said setting device to position said stop abutment dependent upon the position of said setting device, a feed device for feeding from said supply a blank of said resilient material against said stop abutment, and a device for severing a piece from one end of said blank, the height of said piece becoming dependent on the height of said gap.

4,016,025
ELECTRONIC SEALING APPARATUS

Everett A. Peterson, 113 St. Marks Place, Roslyn Heights, N.Y. 11577

Filed June 29, 1976, Ser. No. 700,853
Int. Cl.² B32B *19/02*; H05B *9/04*
U.S. Cl. 156—380 **7 Claims**



1. An apparatus for use in sealing layers of thermoplastic material together from one side of the layers over a relatively thick layer of insulating material, said apparatus comprising means for supporting a first layer of thermoplastic material beneath a layer of insulating material with a marginal portion

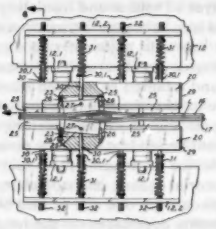
of said thermoplastic material extending beyond said layer of insulating material, means turning the marginal edges of said first layer of thermoplastic material over a marginal portion of said layer of insulating material and means for sealing a second layer of thermoplastic material to the turned over marginal edge of said first layer of thermoplastic material above said layer of insulating material, said sealing means including a support, a first conductive element mounted on said support and adapted to be connected to a source of high frequency energy, a second conductive element mounted on said support in spaced relation to said first conductive element and adapted to be connected to an electrical ground; and means for electrically insulating said first and second elements from each other.

4,016,026

SEGMENTED HEATER FOR BAND SEALERS

John J. Grevich, Star Prairie, Wis., assignor to Domain Industries, Inc., New Richmond, Wis.

Filed Feb. 24, 1975, Ser. No. 552,714
Int. Cl.² B30B *5/06, 15/34*
U.S. Cl. 156—555 **11 Claims**



1. A machine for sealing laminae of film together in closing bags and the like, comprising a frame;

a pair of flexible, endless sealing heat transfer bands confronting each other and traveling together to receive and carry the film laminae therebetween for sealing;

a pair of elongate heater bars on opposite sides of confronting portions of the bands and extending therealong, each of the bars having an elongate front face with a slot therein confronting a respective heat transfer band in spaced relation therewith;

a plurality of elongate heat transfer slides carried in the slot of each heater bar and extending along the adjacent band, each of the slides having a longitudinally extending bearing face continuously engaging and transferring sealing heat to the adjacent band, the slides and heater bars having a non-interfering relation along said slot whereby to permit freedom of movement of the slides in a direction toward and away from the flat side of the bands, and to also permit said slides to be freely obliquely tiltable in the slot about axes extending parallel to the flat sides of the bands in the linear run and also extending transversely of the direction of travel of the bands along the linear runs such that the slides may follow any non-linearity in the bands and to maintain complete face to face contact with the bands as short lengths of the bands variously orient at oblique angles as the film is carried along with the bands; and

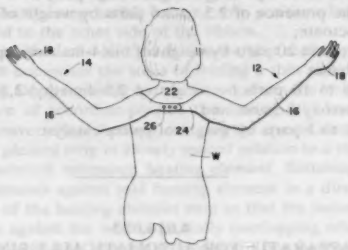
springs urging the slides toward the bands.

4,016,027

COSMETIC GLOVES

Jane Kintanar, Flushing, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Mar. 24, 1976, Ser. No. 670,178
Int. Cl.² A41D *19/00*
U.S. Cl. 2—159 **2 Claims**



1. Cosmetic gloves for smoothing and firming the skin comprising

hand-receiving portions for covering the hands formed from elastomeric and sheer yarn,

an arm-receiving portion integral with each of said hand receiving portions,

an end of each of said arm-receiving portions including a strap, and

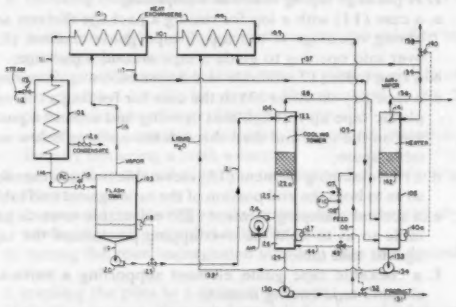
means for adjustably connecting said straps in overlapped relation.

4,016,028

MULTIPLE EFFECT PROCESSES OF CONCENTRATING SOLUTIONS

Walter L. Young; C. J. Douglas; Carl A. Connally, and Robert L. Cheek, all of Tulsa, Okla., assignors to Ozark-Mahoning Company, Tulsa, Okla.

Division of Ser. No. 443,339, Dec. 19, 1970, Pat. No. 3,956,061. This application Apr. 28, 1975, Ser. No. 572,274
Int. Cl.² B01D *1/16, 3/06, 1/00*
U.S. Cl. 159—48 L **5 Claims**



1. A process of concentrating a solution using steam as the basic heat source to heat the solution to be concentrated, comprising:

passing the solution to be concentrated through a series of three successive, temperature increasing, indirect heat exchanging steps to raise the temperature thereof, while maintaining the solution to be concentrated under sufficient back pressure to retain same in liquid form;

the first indirect heat exchanging step being a liquid-liquid heat exchanging step; the second and third indirect heat exchanging steps being vapor-liquid heat exchanging steps;

the heat exchanging medium to the third indirect heat exchanging step being steam;

passing the heated solution from said third indirect heat exchanging step to a flash evaporation step to separate same into liquid and vapor phases;

passing the vapor phase from said flash evaporation step in indirect heat exchange with the solution to be concentrated in the second one of said indirect heat exchanging steps;

passing the liquid phase from the flashing step to an evaporative cooling step wherein same is distributed in counterflow relationship with air in a cooling tower;

there being a water heater of counterflow, liquid-gas direct heat exchange type;

the feed to the water heater comprising the condensate from the second indirect heat exchanging step and the vapor overhead from the cooling tower, both being passed to the lower part of the water heater;

the heat exchanging medium to the first indirect heat exchanging step being the bottoms from the water heater;

the overhead liquid feed to the water heater being the liquid heat exchange medium effluent from the first indirect heat exchanging step;

passing a portion of the liquid bottoms from the cooling tower from the system as product, and

recycling a portion of the liquid bottoms from the cooling tower into the new feed to maintain the evaporation rate and increase the concentration thereof.

4,016,029
PROCESS FOR DELIGNIFYING AND BLEACHING CELLULOSE PULP

Hans Olof Samuelson, Goteborg, Sweden, assignor to Mo och Domsjo Aktiebolag, Ornskoldsvik, Sweden

Filed Mar. 6, 1975, Ser. No. 555,752

Claims priority, application Sweden, Mar. 14, 1974, 7403452

Int. Cl.² D21C *9/10, 11/14*

U.S. Cl. 162—31 **23 Claims**

1. A process for delignifying and bleaching cellulose pulp with improved selectivity which comprises contacting and reacting cellulose pulp, in the absence of a magnesium protector, with oxygen gas in the presence of sodium bicarbonate, as the sole alkali, at an oxygen partial pressure of at least 1 bar at a temperature within the range from about 110° to about 170° C while removing carbon dioxide in an amount to maintain the partial pressure of carbon dioxide within the range from about 0.001 to about 3 bars.

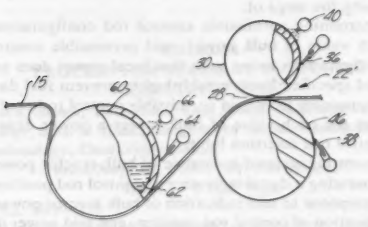
4,016,030
CALENDERING PAPER CONTAINING THERMOPLASTIC CONTAMINANTS

John T. Sobota, Green Bay, Wis., assignor to Fort Howard Paper Company, Green Bay, Wis.

Continuation-in-part of Ser. No. 545,166, Jan. 29, 1975, abandoned. This application Jan. 8, 1976, Ser. No. 647,457

Int. Cl.² D21F *5/06, 9/02*

U.S. Cl. 162—199 **30 Claims**



1. The method of making paper on a paper-making machine of the type having calender rolls and a high-temperature drying section preceding said calender rolls, wherein paper is formed in said machine using pulp made from recycled waste paper, and wherein said pulp contains thermoplastic contaminants in an amount of one percent or less by dry weight, said thermoplastic contaminants having low melting temperatures, comprising drying said paper in said drying section at high temperatures above said melting temperatures such that said paper has a moisture content not greater than substantially 10 percent and such that said paper would be at a temperature on the order of said melting temperatures when said paper is calendered in said calender rolls, calendering said paper at high nip pressures of at least 25 pounds per linear inch in said calender rolls after said paper leaves said drying section, and cooling said thermoplastic contaminants below said melting temperatures after said paper leaves said drying section and before calendering is completed in said calender rolls to reduce the likelihood that said thermoplastic contaminants are in a sticky condition while said paper passes through said calender rolls.

4,016,031
MANUFACTURE OF COMPOSITE MATERIALS

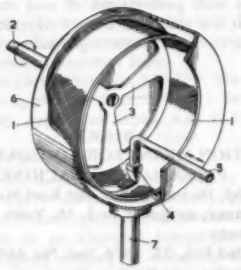
Greville Euan Gordon Bagg, Waltham Abbey; John Cook, Cheshunt; Leslie Ernest Dingle, London; Henry Edwards, Harlow, and Hans Ziebland, Hertford, all of England, assignors to National Research Development Corporation, London, England

Continuation-in-part of Ser. No. 283,665, Aug. 25, 1972, abandoned. This application Jan. 6, 1975, Ser. No. 538,708

Claims priority, application United Kingdom, Sept. 1, 1971, 40699/71

Int. Cl.² D21F *11/06*

U.S. Cl. 162—213 **15 Claims**

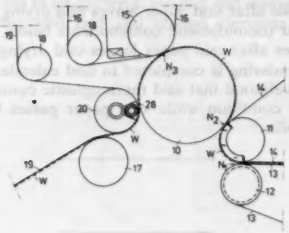


1. A process for the manufacture of composite materials comprising a matrix containing aligned reinforcing fibres including the steps of dispersing the fibres in a liquid dispersion medium, passing the dispersion through a slit shaped aligning nozzle or a tapered nozzle so that the fibres are at least partially aligned and depositing the dispersion containing the aligned fibres upon a permeable surface capable of retaining substantially all the fibres and moving relative to the nozzle at a speed greater than the speed with which the fibres are travelling immediately before deposition and with an angular velocity sufficient to pass the dispersion medium rapidly through the permeable surface by centrifugal acceleration to leave a substantially dry fibre felt and thereby maintaining the alignment of the aligned fibres on the permeable surface such that at least 50% of the fibres are within 10° of the desired alignment direction.

4,016,032
SUCTION ROLL FOR TRANSFERRING A WEB AWAY FROM A PRESS SECTION

Matti Kankaanpaa, Tapiola, Finland, assignor to Valmet Oy, Finland

Continuation-in-part of Ser. No. 310,805, Nov. 30, 1972. This application Apr. 14, 1975, Ser. No. 568,140
Claims priority, application Finland, Dec. 20, 1974, 3720/74
Int. Cl.² D21F *3/04*
U.S. Cl. 162—305 **29 Claims**

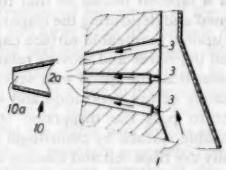


1. In a paper-manufacturing machine, press section means for dewatering a web received by said press section means from a wire while said web travels through said press section means to a drying section of the machine, said press section means including a press roll and a transfer means cooperating with said press roll for transferring the web from said press roll away from the latter toward the drying section, and said transfer means including at least a transfer suction roll means having an outer rotary shell formed with perforations through which suction is applied to the web, said outer rotary shell having opposed ends, suction chamber means situated outwardly beyond said shell closely adjacent to at least one of said ends thereof and communicating with said perforations of said shell at the interior of said shell at least through said one end thereof, and seal means situated at least at said one end of said shell between said suction chamber means and said shell for sealing an area through which said suction chamber means communicates with perforations of said shell at any given instant, so that seal water need not be applied to the interior of said shell to have access through said perforations thereof to the web.

4,016,033
DISTRIBUTION MEANS FOR AQUEOUS SLURRY IN PAPERMAKING MACHINES

Christian Schiel; Dieter Egelhof, and Karl Wolf, all of Heidenheim, Germany, assignors to J. M. Voith GmbH, Heidenheim, Germany

Filed Feb. 23, 1976, Ser. No. 660,705
Claims priority, application Germany, Mar. 1, 1975, 2508929
Int. Cl.² D21F *1/06*
U.S. Cl. 162—343 **8 Claims**

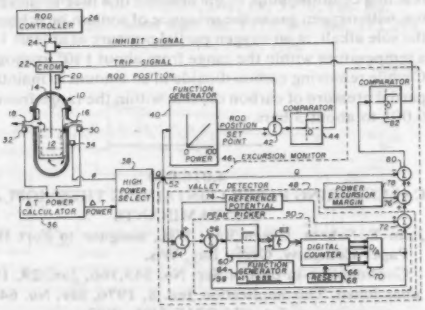


1. In a stock distribution means for delivery of an aqueous slurry in a machine for forming a paper web, a combination comprising a stock-containing stream dividing device; conduits in communication with and receiving streams of stock from said dividing device; means defining a passage communicating with and receiving said streams from said conduits, said passage having a width which equals or approximates the width of the paper web which is formed in said machine; a slice having a discharge orifice; and means defining at least two groups of channels connecting said passage with said slice to deliver stock to said orifice, said channels being inclined with respect to said conduits and each of said channels having a stock-receiving inlet portion communicating with said passage and an outlet portion which discharges stock into said slice, the inlet portions of one group of said groups of channels communicating with said passage upstream of the inlet portions of the other group of said groups of channels and at least a portion of each channel of said one group converging toward the channels of said other group, as considered in the direction in which the stock is fed from said passage to said slice, the cross-sectional areas of inlet portions of said other group of channels exceeding the cross-sectional areas of inlet portions of said one group of channels whereby the inlet portions of said one group of channels offer a greater resistance to the flow of stock from said passage into the inlet portions of said one group of channels and a lower resistance to the flow of stock from said passage into the inlet portions of said other group of channels.

4,016,034
NUCLEAR REACTOR CONTROL OVERRIDE SYSTEM AND METHOD

Charles Ronald Musick, Vernon, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed July 19, 1974, Ser. No. 490,158
Int. Cl.² G21C *7/06, 17/00*
U.S. Cl. 176—22 **14 Claims**



8. A process for the prevention of fuel damage in a critical nuclear reactor having control rods, wherein the process comprising the steps of:

a. determining permissible control rod configurations for each value of bulk power, said permissible control rod configurations being such that local power does not exceed specified limits established to prevent fuel damage;

b. determining from said permissible control rod configurations for each value of bulk power a power dependent control rod insertion limit;

c. generating a signal indicative of bulk reactor power;

d. generating a signal indicative of control rod position; and

e. in response to said indication of bulk reactor power, said indication of control rod position, and said power dependent control rod insertion limit, inserting sufficient negative reactivity to prevent local reactor power from exceeding said specified limits established to prevent fuel damage.

4,016,035

FUEL ASSEMBLY SUPPORT COLUMN FOR A NUCLEAR REACTOR DIAGRID

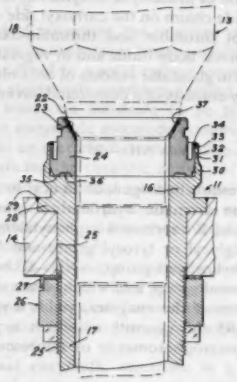
Bernard Gallet, Bruyeres le Chatel, and Robert Venot, Fontenay-aux-Roses, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed June 9, 1975, Ser. No. 584,751

Claims priority, application France, June 12, 1974, 74.20401

Int. Cl.² G21C *21/08*

U.S. Cl. 176—87 2 Claims



1. In a nuclear reactor including a fuel assembly support column, a nuclear reactor diagrid mounted on said column, a hollow cylindrical body rigidly fixed to said diagrid, an upper portion of said body passing through said diagrid and receiving a fuel assembly end-fitting supported vertically by said diagrid, a head for said body, a removable sleeve mounted in said head forming a coaxial extension of said hollow body, a conical bearing surface in said sleeve for sealing and centering the fuel assembly, said removable sleeve and said head of said support column body being engaged in interfitting relation, an annular lip for said sleeve, an annular lip for said head, said lips being in engagement and a removable welded connection sealing said sleeve to said head in an annular zone coaxial with said sleeve at extremities of said lips.

4,016,036

PROCESS FOR SERIALLY CULTURING KERATINOCYTES

Howard Green, Brookline, and James G. Rheinwald, Cambridge, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Nov. 14, 1975, Ser. No. 632,037

Int. Cl.² C12K *9/00*

U.S. Cl. 195—1.8 27 Claims

1. In the growth of keratinocytes in culture, the improvement of including in said culture either fibroblast cells treated to prevent their multiplication and at a density sufficient for keratinocyte multiplication, differentiation and colony expansion or medium conditioned by fibroblast cells.

4,016,037

METHOD FOR PRODUCING L-AMINO ACID

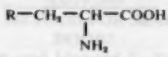
Koji Mitsugi, Yokohama; Konosuke Sano, Machida; Kenzo Yokozeki, Kawasaki; Kazuhiko Yamada, Fujisawa; Ichiro Noda, Yokohama; Teruhiko Kagawa; Chikahiko Eguchi, both of Kawasaki; Naohiko Yasuda, Yokosuka; Fumihide Tamura, Kawasaki, and Kazushi Togo, Yokohama, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Oct. 15, 1975, Ser. No. 622,519

Int. Cl.² C12D *13/06*

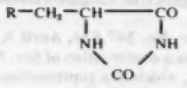
U.S. Cl. 195—29 14 Claims

1. A method for producing an L-amino acid of the formula:



which comprises:

a. holding a hydantoin compound of the formula:



at pH 5 to 11 in an aqueous solution at 15° to 70° C in the presence of an effective amount of enzyme produced by *Flavobacterium aminogenes* until the L-amino acid accumulates in the solution; said enzyme being capable of converting said hydantoin compound to said L-amino acid, and in said formula, R being phenyl or substituted phenyl radicals or indolyl or substituted indolyl radicals; and

b. recovering the L-amino acid formed from said aqueous solution.

4,016,038

PROCESS FOR PREPARING MALTOSES FROM STARCHES

Kaname Sugimoto; Mamoru Hirao; Masashi Kurimoto, and Eikichi Miyake, all of Okayama, Japan, assignors to Hayashibara Company, Okayama, Japan

Continuation-in-part of Ser. No. 810,359, March 25, 1969, abandoned. This application Mar. 27, 1972, Ser. No. 238,608

Claims priority, application Japan, Apr. 1, 1968, 43-21367

Int. Cl.² C12D *13/02*

U.S. Cl. 195—31 R 2 Claims

1. A process for directly preparing maltose of high purity from starches which comprises uniformly gelatinizing and dispersing a starch slurry with a concentration of not less than 10% by weight at an elevated temperature of between 150°–170° C,; rapidly cooling the resulting dispersed starch solution to a temperature between 40° to 70° C. before retrogradation can take place; then adding a heat resistant alpha-1,6-glucosidase produced from *Lactobacillus plantarum* and β-amylase thereto; and conducting a saccharification of the mixture.

4,016,039

PROCESS FOR THE RECOVERY OF PROTEINS FROM AQUEOUS SOLUTIONS OF PROTEINS

Wolfgang Schreiber, Langenfield, Germany, assignor to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

Filed Mar. 22, 1976, Ser. No. 668,840

Claims priority, application Germany, Mar. 22, 1975, 2512735

Int. Cl.² C07G *7/028*

U.S. Cl. 195—66 R 11 Claims

1. In the process for recovering an alkaline protease from

the fermentation of *Bacillus licheniformis* in aqueous solutions comprising the steps of adding a sufficient amount of a water-soluble inorganic salt to an aqueous solution of an alkaline protease from the fermentation of *Bacillus licheniformis* to effect precipitation of said alkaline protease, filtering the aqueous solution containing the precipitated alkaline protease in the presence of from 0 to 4% by weight of filter aids, and recovering said precipitated alkaline protease, the improvement which consists in adding from 0.5 to 3% by weight of a polyoxyethylene glycol having an average molecular weight of from 400 to 1,000 to said aqueous solution of alkaline protease before adding said inorganic salt.

4,016,040
PREPARATION OF ENZYME-CONTAINING BEADS

Maung Hla Win, Berkeley Heights; Walter Anthony DiSalvo, North Arlington, and Edward Joseph Kenney, Bernardsville, all of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 347,534, April 3, 1973, Pat. No. 3,858,854, which is a continuation of Ser. No. 98,111, Dec. 14, 1970, abandoned, which is a continuation-in-part of Ser. No. 883,955, Dec. 10, 1969, abandoned. This application Nov. 1, 1974, Ser. No. 519,827

Int. Cl.² C07G *7/02*

U.S. Cl. 195—68 **3 Claims**

1. A process for manufacturing free-flowing substantially dust-free, substantially spherical, enzyme-containing beads consisting essentially of a water dispersible solid, fusible, substantially anhydrous, nonionic detergent binder having a melting point up to about 60° C., having dispersed therein an enzyme concentrate consisting essentially of proteolytic enzyme, said binder having a hydrophilic polyethylene oxide chain of 6 to 84 ethylene oxide units, the concentration of the proteolytic enzyme in said beads being sufficient so that the beads contain about 0.1 to 5 Anson units per gram, with substantially all of said beads passing through a 10 mesh U.S. Standard Sieve Series screen and at most about 11.2% of said beads passing through a 100 mesh U.S. Standard Sieve Series screen, which comprises blending a powdered concentrate of said enzyme with said binder in molten form and spraying droplets of said blend through a spray nozzle into cool air in a cooling tower to solidify said droplets and form said beads.

4,016,041
PROCESS OF MAKING GRANULAR ENZYMES OF REDUCED STICKINESS

Daniël Marten van Kampen, Vlaardingen, Netherlands, assignor to Lever Brothers Company, New York, N.Y.

Filed Jan. 22, 1976, Ser. No. 651,672

Claims priority, application United Kingdom, Feb. 12, 1975, 5978/75

Int. Cl.² C07G *7/02*

U.S. Cl. 195—68 **2 Claims**

1. In a process for the preparation of enzyme-marumes with a reduced stickiness and an improved sievability, comprising forming an extrudate of a mixture of proteolytic or amylolytic enzymes and an organic or inorganic extrudable material, spheronizing the extrudate to form marumes while adding a dusting powder during the spheronizing operation, the improvement comprising adding magnesium oxide or a mixture of magnesium oxide with magnesium carbonate in a weight ratio of 10:1 as dusting powder, said powder having an average particle size ranging from 40 to 250 microns, in an amount of 0.1–5% by weight of the marumes.

4,016,042
SUBSTRATE FOR THE QUANTITATIVE DETERMINATION OF ENZYMES

Lars Gundro Svendsen, Reinach, Switzerland, assignor to Pentapharm A.G., Basel, Switzerland

Filed June 30, 1975, Ser. No. 592,023

Claims priority, application Switzerland, July 2, 1974, 9210/74; May 9, 1975, 6088/75

Int. Cl.² G01N *31/14*

U.S. Cl. 195—103.5 R **12 Claims**

1. A chromogenic or fluorescent substrate for the quantitative determination of proteolytic enzymes of class E.C. 3.4.4., which split peptide chains on the carboxyl side of arginine and of lysine, except thrombin and thrombin-like enzymes, in human and mammal body fluids and in vegetable and animal cell extracts and in glandular venoms of cold-blooded animals, which essentially consists of a compound having the following formula:

$$R^1 - Pro - X - Y - NH - R^2 \qquad I$$

wherein R^1 represents hydrogen, or an acyl or sulfonyl group, R^2 represents an aromatic hydrocarbon group which may carry substituents, X represents a phenylalanyl, β-cyclohexylalanyl, phenylglycyl or tyrosyl group and Y represents a protonized arginyl or lysyl group, —NH—R^2 being a chromogenic or fluorescent group, and which, when subjected to the proteolytic action of the enzymes, yields a split product of formula NH_2—R^2 the quantity of which is measurable by photometric, spectrophotometric or fluorescence-photometric methods.

4,016,043
ENZYMATIC IMMUNOLOGICAL METHOD FOR THE DETERMINATION OF ANTIGENS AND ANTIBODIES

Antonius H. W. M. Schuurs; Bauke K. Van Weemen, and Gerrit Wolters, all of Oss, Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

Filed Sept. 4, 1975, Ser. No. 610,469

Int. Cl.² C12K *1/04*

U.S. Cl. 195—103.5 R **8 Claims**

1. A method for the detection and determination of a component of an antigen-antibody reaction in a liquid sample containing the component to be determined, comprising the steps of:

a. providing a given quantity of a first reagent consisting of one component of said reaction selected from the group consisting of an antigen and an antibody bound to the surface of a water-insoluble, water-insuspensible, solid carrier;

b. providing a given amount of a second reagent consisting of a component having the same immunological properties as the component in the said first reagent covalently linked to an enzyme, and also providing a predetermined amount of the binding partner for the component to be determined, when the component in said liquid sample and the component bound to said solid carrier have the same immuno-chemical properties;

c. contacting a given quantity of said liquid sample with said reagents forming a reaction mixture having a solid phase and a liquid phase; and

d. determining the enzyme activity of either the solid or the liquid phase which is a measure of the presence and quantity of the component to be determined.

4,016,044
METHOD AND APPARATUS FOR GOVERNING THE REACTION RATE OF ENZYMATIC REACTIONS

Jean-Marie Fresnel, Haut-Thoiry, France, and Daniéle Trosset, Carouge, Switzerland, assignors to Battelle Memorial Institute, Switzerland

Continuation-in-part of Ser. No. 431,608, Jan. 8, 1974, Pat. No. 3,919,052. This application May 29, 1975, Ser. No. 581,761

Claims priority, application Switzerland, Jan. 10, 1973, 259/73; Jan. 10, 1973, 260/73

Int. Cl.² C12B *1/00*

U.S. Cl. 195—115 **14 Claims**

1. A method of governing the reaction rate of enzymatic reactions for continuously transforming a substrate by contact with an enzyme fixed to a solid carrier, comprising the steps of: bringing an electrically conductive liquid reaction system, containing at least one substrate to be transformed, into contact with an enzymatic electrode comprising at least one enzyme fixed to an electrically conductive solid support medium; and regulating the catalytic activity of said enzyme by applying an electric potential to said support medium while adjusting the value of said potential so as to transform said substrate at a given rate, said method further comprising the improvements consisting of:

a. providing said enzymatic electrode with a solid, inert, working electrode and with a particulate mass of discrete enzymatic particles, each formed essentially of said conductive support medium having said enzyme fixed to the surface thereof;

b. placing said enzymatic electrode in a reaction space wherein said particulate mass of enzymatic particles is arranged for electrical contact thereof with said working electrode;

c. circulating said liquid reaction system within said reaction space; and

d. applying said adjustable potential, via said working electrode, to the conductive support medium of said enzymatic particles.

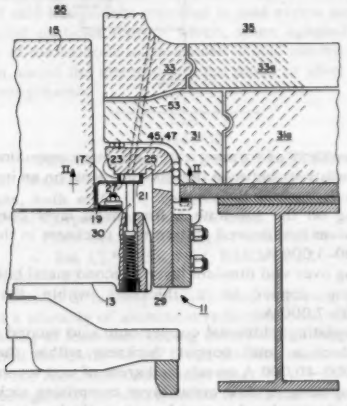
4,016,045
COKE OVEN DOOR SEALING SYSTEM

Joseph Van Ackeren, Allison Park, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Feb. 18, 1976, Ser. No. 658,928

Int. Cl.² C10B *1/06, 25/06, 25/16, 29/00*

U.S. Cl. 202—242 **6 Claims**



1. In combination, a coke oven having a chamber for coking coal and generating coke oven gases and a coke oven door sealing arrangement, said coke oven chamber having a coke oven door at one end thereof and heating flues at both sides thereof, said door coacting with a door jamb mounted cooperatively with an end brick structure of said heating flues at the ends thereof adjacent to said door, said coke oven door sealing arrangement comprising,

a. a U-shaped sealing strip carried by said door that cooperates with a sealing surface of said door jamb and forms a fluid channel around said door;

b. means dividing said channel into separate fluid channelways; and

c. means fluidly communicating each one of said channelways with a respective end flue, whereby coke oven gases in said channelways flow into said end flues.

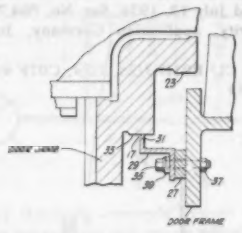
4,016,046
APPARATUS AND METHOD FOR SEALING COKE OVEN DOORS

Joseph Van Ackeren, and Linwood G. Tucker, both of Pittsburgh, Pa., assignors to Koppers Company, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 397,708, Sept. 17, 1973, abandoned. This application Oct. 15, 1974, Ser. No. 514,304

Int. Cl.² C10B *1/06, 29/00;* **F23M** *5/08*

U.S. Cl. 202—248 **3 Claims**



1. In a coke oven battery having a door jamb at each end of each chamber of said battery, and a door adapted to coact with each door jamb and form a seal therewith, the improvement comprising:

a. a first sealing member mounted to said door that coacts with a first sealing surface of said door jamb, said first sealing member extending completely around the periphery of said door;

b. a second sealing member mounted to said door that coacts with a second sealing surface of said door jamb, said second sealing member extending only along two opposite vertical edges and the bottom edge of said door, said second sealing member being disposed between said chamber and said first sealing member and forming thereby a plenum between said sealing members; and

c. means for pressurizing said plenum.

4,016,047
SEPARATION AND RECOVERY OF POLYCHLORINATED PHENOLS

Ray C. Christena, Wichita, Kans., assignor to Vulcan Materials Company, Birmingham, Ala.

Continuation of Ser. No. 414,533, Nov. 9, 1973, Pat. No. 3,909,365. This application Mar. 21, 1975, Ser. No. 560,800

Int. Cl.² C07C *39/36*

U.S. Cl. 203—6 **5 Claims**

1. A method for the separation and recovery of polychlorinated phenols from dark color-forming impurities contained therein comprising the steps of: (a) introducing into a distilland mixture of at least one polychlorinated phenol and dark color-forming impurities, an amount effective to inhibit color formation of at least one color inhibitor selected from the group consisting of; a phenol derivative selected from the group consisting of 2,6-ditertiary butyl cresol, alpha naphthol, p-aminophenol 4-(methylthio) phenol, 2,2′-methylenebis

(4-methyl-6-tertbutyl phenol), 2,2'-methylenebis (4-ethyl-6-tertbutyl phenol), and p-tertiary butyl catechol a hydroquinone compound selected from the group consisting of hydroquinone, 2,5-ditertiary butyl hydroquinone, monotertiary butyl hydroquinone, and the monomethyl ether of hydroquinone; an organic sulfur compound selected from the group consisting of alkyl phenol disulfide, liquid thiocarbamate, ditridecylthiodipropionate, and distearylthiodipropionate; and an organic phosphite compound selected from the group consisting of trinonyl phosphite, tris-2(chloroethyl)-phosphite, and triisooctyl phosphite, (b) distilling the resulting color inhibitor containing distilland to separate polychlorinated phenol vapors therefrom; and (c) condensing said vapor to recover purified polychlorinated phenols in an amount of at least about 84 percent of the impurity-containing polychlorinated phenol.

4,016,048

DISTILLATIVE PURIFICATION OF 2,5-DIOXO-1-OXA-2-PHOSPHOLANES

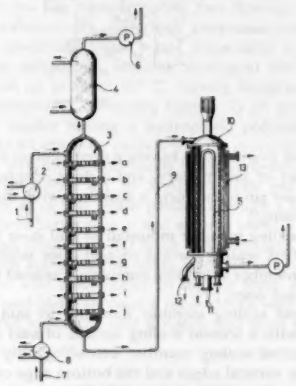
Klaus Gehrmann, Erftstadt-Lechenich; Alexander Ohorodnik, Erftstadt-Liblar; Elmar Lohmar, Rodenkirchen, and Wernfried Riechmann, Bruhl, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 13, 1976, Ser. No. 704,774

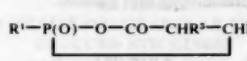
Claims priority, application Germany, July 17, 1975, 2531920

Int. Cl.² B01D *3/28, 3/34;* **C07F** *9/02*

U.S. Cl. 203—49 **4 Claims**



1. A process for the distillative purification of a 2,5-dioxo-1-oxa-2-phospholane of the formula:



in which R^1 stands for an alkyl radical having from 1 to 4 carbon atoms, or a phenyl radical, and R^2 and R^3 each stand for hydrogen or CH_3, which comprises: preheating the respective crude compound to 120° to 160° C and feeding it to the head of a distilling column provided with a plurality of individually heatable trays maintained at temperatures increasing (as herein defined) from the uppermost tray to the lowermost, the uppermost tray in the column being maintained at 120° to 160° C and the lowermost tray being maintained at 160° to 200° C, the pressure at the head of the column being 20 to 200 mm Hg; introducing an inert gas (as herein defined) preheated to 160° to 200° C countercurrently at the base of the column; withdrawing overhead those impurities having a boiling point lower than that of the respective 2,5-dioxo-1-oxa-2-phospholane, together with the inert gas; withdrawing the 2,5-dioxo-1-oxa-2-phospholane thus freed from low-boiling impurities from the base of the distilling column and passing it to a film evaporator; and distilling off the 2,5-dioxo-1-oxa-2-phospholane from higher boiling impurities in the film evaporator under a pressure of 0.1 to 5 mm Hg.

4,016,049

SEPARATION OF PHENOL-CYCLOHEXANONE AZEOTROPE BY EXTRACTIVE DISTILLATION WITH ADIPIC ACID DIESTER

George B. Fozzard, and Robert A. Paul, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed July 28, 1976, Ser. No. 709,367

Int. Cl.² B01D *3/40;* **C07C** *37/22*

U.S. Cl. 203—60 **5 Claims**

1. A process for the separation by extractive distillation of a cyclohexanone and phenol containing mixture which comprises subjecting the mixture to extractive distillation conditions in the presence of an adipic acid diester extractive distillation agent.

4,016,050

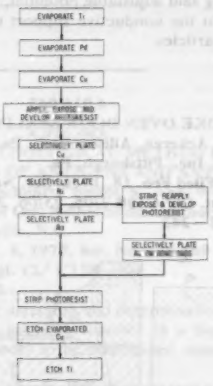
CONDUCTION SYSTEM FOR THIN FILM AND HYBRID INTEGRATED CIRCUITS

Nathan George Lesh, deceased, late of Bethlehem, Pa.; by Merchants National Bank of Allentown, executor, Allentown; Joseph Michael Morabito, Bethlehem, both of Pa., and John Henry Thomas, III, Pickerington, Ohio, assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 12, 1975, Ser. No. 576,711

Int. Cl.² C25D *5/02, 5/10*

U.S. Cl. 204—15 **19 Claims**



1. A method of forming electrical interconnections of a desired resistivity between thin film elements on an insulating substrate comprising the steps of:

forming on the substrate a first metal layer comprising titanium in a desired pattern to a thickness in the range 1,500–3,000 A;

forming over said titanium layer a second metal layer comprising copper to a thickness within the range 3,000–7,000 A;

electroplating additional copper onto said second layer to produce a total copper thickness within the range 25,000–40,000 A on selected areas of said second layer;

electroplating a third metal layer comprising nickel over said electroplated copper layer to a thickness within the range 8,000–20,000 A;

electroplating a fourth metal layer comprising gold on at least portions of said third layer to a thickness within the range 15,000–25,000 A; and

removing those portions of said first and second layers which are not covered by said electroplated metals.

4,016,051

ADDITIVES FOR BRIGHT PLATING NICKEL, COBALT AND NICKEL-COBALT ALLOYS

Charles Geldzahler, and Satwant S. Sodhi, both of Chicago, Ill., assignors to Starlite Chemicals, Inc., Chicago, Ill.

Filed May 2, 1975, Ser. No. 574,031
Int. Cl.² C25D *3/12, 3/56*
U.S. Cl. 204—43 T **5 Claims**

1. A process for producing bright nickel, cobalt or nickel-cobalt alloy deposits which comprises, electrodepositing nickel, cobalt or nickel-cobalt from an acidic aqueous plating solution of at least one salt of nickel, cobalt or nickel-cobalt and containing from about 0.005 to about 0.3 grams per liter of diethylaminopropyne sulfate, which is made by the method comprising the steps of adding diluted sulfuric acid slowly to the amine while vigorously agitating the solution, maintaining the solution at a temperature not exceeding 15° C, and terminating the addition of the diluted sulfuric acid when a pH in the range of 4.2 to 4.5 is obtained and including heating the plating solution above 60° C so as to increase the efficiency of the process.

4,016,052

ELECTRODEPOSITION PROCESS

Shin-Ichi Tokumoto; Eiji Tanaka; Kenji Ogisu, and Hiroji Kawai, all of Yokohama, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 17, 1975, Ser. No. 632,808
Int. Cl.² C25C *3/00*
U.S. Cl. 204—64 T **10 Claims**

1. In the process of electrodepositing a metal or alloy on a cathode immersed in an agitated fused-salt electrolyte comprised of halide salts including salts of said metal or of the constituent metals of said alloy, and in which the electrodeposition is effected at a predetermined temperature of said electrolyte; the improvement comprising the steps, in advance of said electrodeposition, of providing at least one of said halide salts in said electrolyte in an amount substantially in excess of the solubility level thereof at said predetermined electrodeposition temperature, heating the fused-salt electrolyte to a temperature substantially above said electrodeposition temperature so as to melt the electrolyte including substantially all of each of said halide salts provided in said excess amount, and then cooling the thus melted fused-salt electrolyte to said electrodeposition temperature so as to crystallize a portion of each of said halide salts provided in said excess amount and form solid particles thereof which, when agitated near the surface of the cathode in the course of said electrodeposition thereon, cause the electrodeposited metal or alloy to be flat and homogeneous.

4,016,053

FEEDING PARTICULATE MATTER

Ivan D. Stankovich, Piedmont, and Stavros D. Louchis, Orinda, both of Calif., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Oct. 1, 1975, Ser. No. 618,544
Int. Cl.² C25B *3/04;* **B65G** *53/22*
U.S. Cl. 204—67 **9 Claims**

1. A method of feeding finely divided reduction-grade alumina to a plurality of aluminum reduction cells, each of said cells having at least one feeding device with a supply hopper associated therewith which feeds discrete quantities of alumina to the reduction cells comprising

a. feeding finely divided alumina from a source thereof to a primary air-activated gravity conveyor system;

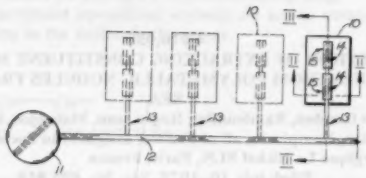
b. fluidizing the alumina in the primary air-activated gravity conveyor system and continuously maintaining the primary air-activated gravity conveyor systems essentially full of fluidized alumina;

c. transferring alumina from the primary air-activated gravity conveyor system to a plurality of secondary air-activated gravity conveyor systems;

d. fluidizing alumina in the secondary air-activated gravity conveyor systems and continuously maintaining the secondary conveyors essentially full of fluidized alumina;

e. transferring alumina from the secondary air-activated gravity conveyor systems to the supply hoppers associated with the feeding devices and maintaining the level of alumina within the feed hoppers at a desired level so that when one or more of the feeding devices feed discrete quantities of alumina to a reduction cell, the supply hopper is refilled with alumina from the secondary air-activated gravity conveyor system, the secondary air-activated gravity conveyor system is refilled with alumina from the primary air-activated gravity conveyor system and the primary air-activated gravity conveyor system is refilled with alumina from the alumina source.

5. A system for transferring finely divided particulate matter from a source thereof to a plurality of discharge points, each of said discharge points having a feeding device associated therewith for feeding discrete quantities of particulate matter comprising



a. a primary fluidizing conveyor system which receives particulate matter from said source and which is provided with means to fluidize particulate matter received from said source to cause said fluidized particulate matter to flow within the primary fluidized conveyor system and to continuously maintain the primary fluidizing conveyor system essentially full of fluidized particulate matter;

b. a plurality of secondary fluidizing conveyor systems which receive particulate matter from the primary fluidizing conveyor system and which are provided with means to fluidize particulate matter therein, to cause the said fluidized particulate matter to flow within the secondary fluidizing conveyor systems and to continuously maintain the secondary fluidizing conveyor essentially full of particulate matter; and

c. hoppers associated with the feeding devices to supply particulate matter thereto which receive particulate matter from the secondary fluidizing conveyors and which are provided therein with open-topped fluidizing conveyors in fluid communication with the secondary fluidizing conveyors to feed particulate matter to the inner chamber of said hopper.

4,016,054

HYDROMETALLURGICAL TREATMENT PROCESS FOR EXTRACTING CONSTITUENT METAL VALUES FROM FERRO-NICKEL

Louis Gandon, Rambouillet, and Jean-Michel Demarthe, Viroflay, both of France, assignors to Imetal, Paris, France

Filed July 10, 1975, Ser. No. 594,812
Claims priority, application France, July 10, 1974, 74.24017
Int. Cl.² C25C *1/08, 1/10;* **C25G** *1/00;* **C22B** *3/00*
U.S. Cl. 204—105 R **22 Claims**

1. A hydrometallurgical treatment process for extracting constituent metal values from ferro-nickel containing cobalt, comprising the following steps:

a. treating said ferro-nickel with chlorine in an aqueous medium and filtering the resultant matter;

b. oxidising said filtrate;

c. removing the iron contained in said oxidised filtrate by liquid/liguid extraction using an organic extractant (i) containing tributyl phosphate and regenerating said organic extractant (i) using an aqueous stripping solution (ii) thus yielding a pure aqueous solution of ferric chloride; and

d. removing the cobalt contained in said oxidised filtrate by liquid/liquid extraction using an organic extractant (iii) containing a tertiary amine and regenerating said organic extractant (iii) using an aqueous stripping solution (iv) thus yielding a pure aqueous solution of cobalt cloride, the chloride, oxidised filtrate comprising a solution of nickel chloride.

4,016,055

METHOD OF EXTRACTING CONSTITUENT METAL VALUES FROM POLYMETALLIC NODULES FROM THE SEA

Louis Gandon, Rambouillet; Roger Jean, Maurepas, and Serge Solar, Dampierre, all of France, assignors to Societe Metallurgique Le Nickel SLN, Paris, France

Filed July 10, 1975, Ser. No. 594,814

Claims priority, application France, July 10, 1974, 49.24016

Int. Cl.² C25C *1/12*, *1/06*

U.S. Cl. 204—106 **11 Claims**

11. A method of extracting constituent metal values from polymetallic nodules from the sea, comprising the following steps in succession:

a. melting the nodules under reducing conditions at a temperature up to 1700° C in the presence of a carbonaceous reducing agent in an amount of about from 3 to 10% of the weight of the melt;

b. reacting gaseous chlorine with the metal concentrate at a temperature of from 70° to 100° C in a reaction column continuously supplied at its lower end with water and gaseous chlorine and at its upper end with the metal concentrate, aqueous solution being continuously withdrawn from an upper part of the column, part of the withdrawn aqueous solution being recycled to the lower end of the reaction column, the amount of chlorine used being between 0.9 to 1.1 times that stoichiometrically necessary;

c. precipitating the copper contained in the aqueous solution using a more electropositive metal powder, and melting and casting the precipitate into anodes;

d. electro-refining the copper precipitate anodes;

e. removing the iron contained in the solution issuing from step (c) by liquid-liquid exchange by means of a first organic phase containing tributyl phosphate and regenerating said first organic phase by means of a first aqueous phase thus yielding a pure aqueous solution of ferric chloride;

f. removing the cobalt contained in the solution issuing from step (c) by liquid-liquid exchange by means of a second organic phase containing tri-isooctylamine and regenerating said second organic phase by means of a second aqueous phase thus yielding a pure aqueous solution of cobalt chloride; and

g. electrolyzing the aqueous solution resulting from the purification and removal in steps (e) and (f) to yield nickel and recycling the produced chlorine to reaction step (b).

4,016,056

METHOD OF OBTAINING COPPER FROM SULPHURIZED CONCENTRATES

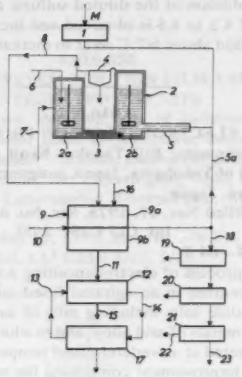
Jean-Michel Demarthe, Viroflay; André Georgeaux, Rambouillet, and Alain Sonntag, Maurepas, all of France, assignors to Societe Miniere et Metallurgique de Penarroya, Paris, France

Filed May 15, 1975, Ser. No. 577,658

Claims priority, application France, May 15, 1974, 74.16772

Int. Cl.² C25C *1/12*

U.S. Cl. 204—108 **16 Claims**



1. A method for obtaining electrolytic copper and other useful metals from sulphurized concentrates, comprising, in combination, the following stages:

a. lixiviating said sulphurized concentrate with an aqueous solution containing cupric chloride formed in situ, at least in part, by oxidation, by introducing hydrochloric acid and air into the cuprous chloride solution resulting from lixiviation;

b. partially extracting the copper contained in the lixiviation solution resulting from stage a), by contacting said lixiviation solution with an organic extractant containing a cationic solution, said extraction being accompanied by oxidation by injecting air into said lixiviation solution;

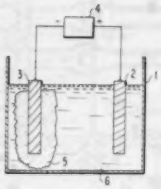
c. re-extracting the copper contained in said organic extractant by contacting said organic extractant with an aqueous solution of sulphuric acid and recycling the organic extractant to the extraction stage b); and

d. electrolyzing the copper sulphate obtained in stage c), to yield copper and an aqueous solution of sulphuric acid which is recycled to the re-extraction stage (c), at least part of the aqueous solution, which results from the partial copper extraction stage (b), being recycled to the lixiviation stage (a) and constituting a part of said cupric chloride solution, the other part of said aqueous solution being treated to recover the useful metals and the hydrochloric acid that it contains.

4,016,057
PROCESS OF PRODUCING FERROMAGNETIC MATERIALS

Shin-ichiro Dezawa, and Yasuo Tamai, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Dec. 1, 1975, Ser. No. 636,464
Claims priority, application Japan, Nov. 29, 1974, 49-137934; Nov. 29, 1974, 49-137935
Int. Cl.² C25C *5/00*
U.S. Cl. 204—130 **19 Claims**

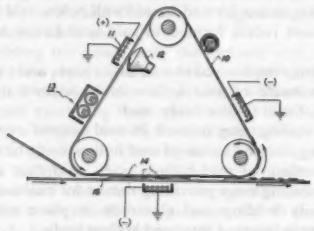


1. A process for improving the properties of a ferromagnetic material which comprises electrolyzing the ferromagnetic particles in an aqueous medium having a conductivity of greater than 50 milli moh/cm, containing a water-soluble electroconductive salt, and containing an anode and cathode while said ferromagnetic particles are in electrical contact with the cathode.

4,016,058
PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS

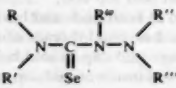
Joseph Y. C. Chu, Fairport, and W. H. H. Gunther, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 454,896, March 26, 1974. This application Jan. 15, 1976, Ser. No. 649,436
Int. Cl.² B01J *1/10*
U.S. Cl. 204—158 R **1 Claim**



1. A process for preparation of a solid phase dispersion of inorganic photoconductive materials in an insulating polymeric matrix comprising:

a. forming a solid phase dispersion from a film forming insulating polymeric resin and at least one organo-selenium compound of the formula



wherein R, R′, R″, R‴ and R^{iv} are independently selected from hydrogen, alkyl, of 1 – 10 carbon atoms, phenyl, substituted phenyl, benzyl, and substituted benzyl; and

b. subjecting said polymeric composition to sufficient energy to decompose said selenium compound whereby elemental selenium is deposited within the organic polymeric composition in substantial conformity with the distribution of said energy throughout the composition.

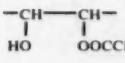
4,016,059
METHOD FOR CURING INK AND COATING COMPOSITIONS OF ACRYLATED EPOXIDIZED SOYBEAN OIL AMINE COMPOUNDS

David John Trecker, Old Lyme; George Wayne Borden, East Lyme, both of Conn., and Oliver Wendell Smith, South Charleston, W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 476,054, June 3, 1974, Pat. No. 3,931,071, which is a division of Ser. No. 343,692, March 22, 1973, Pat. No. 3,878,077, which is a division of Ser. No. 103,912, Jan. 4, 1971, abandoned. This application Mar. 28, 1975, Ser. No. 563,132
Int. Cl.² B01J *1/10*
U.S. Cl. 204—161 **7 Claims**

1. A method for curing a composition comprising:

I. an acrylated epoxidized soybean oil amine compound having in the molecule the group:



wherein X in hydrogen or methyl and R′ taken singly is alkyl of 1 to 15 carbon atoms or aryl having up to 15 carbon atoms and the two R′ groups taken together with the nitrogen atom attached thereto form a heterocyclic ring having from 5 to 6 ring atoms, said compound being the reaction product of:

A. epoxidized soybean oil reacted with at least 2 moles of acrylic acid or methacrylic acid per mole thereof and

B. from 5 to 40 mole percent, based on acrylyl groups of an organic amine of the formula R'_2NH wherein R′ is as defined above, and

II. an acrylyl compound, said method comprising exposing said composition to ionizing radiation, non-ionizing radiation, ultraviolet light radiation or high intensity predominantly continuum light radiation for a period of time sufficient to cure said compound to a tack-free state.

4,016,060
CORONA REACTION METHOD AND APPARATUS

Frank Eugene Lowther, Severna Park, Md., assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 13, 1975, Ser. No. 558,046
Int. Cl.² C01B *13/11*
U.S. Cl. 204—176 **18 Claims**

1. A process for conducting corona discharge reactions between spaced electrodes comprising the steps of:

a. passing a reactant gas through a corona discharge gap formed between said spaced electrodes;

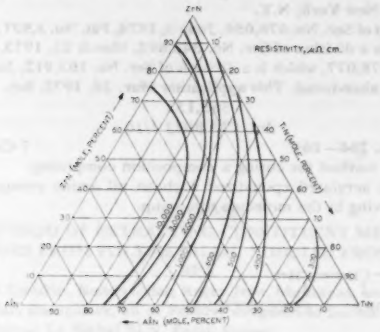
b. periodically establishing a corona discharge by dissipating narrow pulse electrical power of high voltage in said gap with the width of each narrow pulse being a relatively small fraction of the pulse period as well as being less than the gas ion transit time across said gap and greater than the electron transit time; and

c. maintaining a low voltage bias potential across said gap during the interval between said narrow pulses of a predetermined minimum magnitude sufficient to remove a substantial number of gas ions from said gap being the termination of each pulse period.

4,016,061
METHOD OF MAKING RESISTIVE FILMS

Kiyotaka Wasa, Nara; Fumio Hosomi, Higashiosaka, and Shigeru Hayakawa, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 227,070, Feb. 17, 1972, Pat. No. 3,803,057. This application Jan. 16, 1974, Ser. No. 433,892
Claims priority, application Japan, Mar. 17, 1971, 46-15273; Mar. 17, 1971, 46-15274; Mar. 11, 1971, 46-13829
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976
Int. Cl.² C23C *15/00*
U.S. Cl. 204—192 F 5 Claims



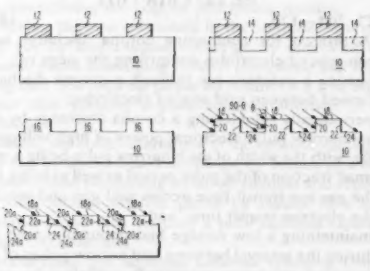
1. A method of making a thin resistive film comprising cathodically sputtering the thin resistive film onto a substrate from a composite cathode consisting essentially of Al, Ti and Zr and having a structure such that the surface area is 5 to 40% Al, 15 to 85% Ti and 10 to 80% Zr, the ratio of the area Al to Ti being less than 0.7, in a nitriding atmosphere at a pressure of 10^{-4} to 10^{-3} Torr.

3. A method of making a thin resistive film comprising cathodically sputtering the thin resistive film onto a substrate from a composite cathode consisting essentially of 10 to 50 mole % of AlN, 10 to 80 mole % of ZrN and 10 to 80 mole % of TiN, the mole ratio of the AlN to TiN being less than 1.2, in a non-reactive gas at a pressure of 10^{-4} to 10^{-3} Torr.

4,016,062
METHOD OF FORMING A SERRATED SURFACE TOPOGRAPHY

Rajendra Rangraj Mehta, Palo Alto, and Otto Voegeli, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 11, 1975, Ser. No. 612,382
Int. Cl.² C23C *15/00*
U.S. Cl. 204—192 E 9 Claims



1. A method of forming a serrated surface topography comprising the steps of

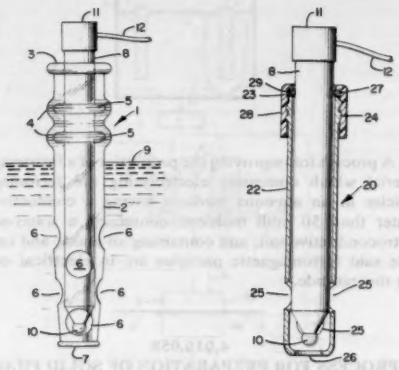
forming a structure having a substantially rectangular wave surface topography,

ion milling said rectangular wave surface topography at an oblique angle of incidence to form a serrated surface topography.

4,016,063
ELECTRODE SHIELD

Desmond Arpad Radnoti, 670 Alta Vista, Sierra Madre, Calif. 91024

Filed Aug. 6, 1975, Ser. No. 602,407
Int. Cl.³ G01N *27/36*
U.S. Cl. 204—195 R 6 Claims



1. An electrode shield for housing and protecting an electrode, said shield comprising:

a hollow generally cylindrical shaped body having an opening at the top end thereof for receiving said electrode, an opening at the bottom end thereof smaller than said opening at said top end, a plurality of openings spaced apart along a portion of the wall thereof from said bottom end, a first recess formed in said wall below said opening and second recess formed in said wall below said first recess;

a first sealing ring housed in said first recess and extending into the inside of said hollow body beyond the inner surface of said hollow body; and

a second sealing ring housed in said second recess and extending into the inside of said hollow body beyond the inside surface of said hollow body, said first and said second sealing rings providing means for cushioning and frictionally holding said electrode in place when said electrode is inserted into said hollow body.

4. An electrode shield for housing an electrode, said shield comprising:

A hollow generally cylindrical shaped body having an opening at the top end thereof for receiving said electrode, an opening at the bottom end thereof smaller than said opening at said top end, a plurality of openings in the wall of said hollow body, said plurality of openings being spaced apart from said bottom end, and external threads formed adjacent said top end;

A cap being open at both ends and having internal threads for engaging said external threads of said hollow body to removably secure said cap to said hollow body; and

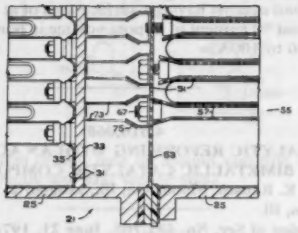
A sealing ring nested inside of said cap such that said sealing ring is compressed against the top end of said hollow body at the inside of said cap, said sealing ring providing cushioning means and means to frictionally hold said electrode in place when said electrode is slipped through said cap into said hollow body.

4,016,064

DIAPHRAGM CELL CATHODE STRUCTURE

Hugh Cunningham; Carl W. Raetzsch; George L. Rich, and John D. Driskill, all of Corpus Christi, Tex., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 28, 1975, Ser. No. 636,019
Int. Cl.² C25B 9/00
U.S. Cl. 204—256 10 Claims



3. A method of assembling a diaphragm electrolytic cell having hollow fingered cathodes extending outwardly from a cathode back screen, each of said cathodes having an open base and having side walls, a top, a bottom, and a leading edge fabricated of foraminous metal, said cathodes and back screen being electrically and mechanically connected to a cathode base plate and having a permeable diaphragm thereon and said cell further having an anode unit with fingered anodes extending outwardly from an anode base plate, each of said anodes being interleaved between a pair of said cathodes, which method comprises:

inserting individual cathodes having bolt means projecting outwardly from the open base thereof between pairs of adjacent anodes;

positioning the cathode back screen on a plane substantially defined by the open bases of the individual fingered cathodes and passing the bolt means through apertures in the cathode back screen;

placing elastic conductor means onto said bolt means on the opposite side of the cathode back screen from the cathodes;

fastening the elastic conductor means, the bolt means, the back screen, and the cathode fingers together to form a cathode unit; and

assembling the anode unit, the cathode unit, and the cathode base plate together with the elastic conductor means of said cathode unit co-operating with elastic conductor means extending from said cathode base plate so as to form a single electrolytic diaphragm cell.

9. In a diaphragm electrolytic cell having a plurality of fingered anode blades extending outwardly from an anode base plate and cathode means electrically and mechanically connected to a cathode base plate parallel to and spaced from said anode base plate, said cathode means comprising a cathode back screen spaced from and parallel to said cathode base plate and plurality of hollow cathode fingers extending outwardly from said cathode back screen between said anode blades, each of said cathode fingers having an open base, and having side walls, a top, a bottom, and a leading edge fabricated of foraminous metal, the improvement comprising:

bolt means electrically and mechanically connected to each of said cathode fingers and extending outwardly from the open base thereof;

apertures in said cathode back screen corresponding to and of greater diameter than said bolt means whereby said cathode fingers are slideably adjustable; and

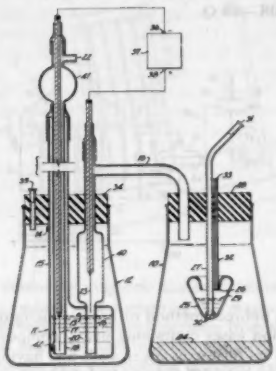
first elastic electrical conductor means extending outwardly from the cathode base plate toward the cathode back screen and second elastic electrical conductor means in electrical contact with said bolt means, on the opposite side of said cathode back screen from the cathode fingers, said first electrical conductor means and said second electrical conductor means being in electrical contact with each other.

4,016,065

ELECTROLYTIC FIELD RESPIROMETER

Sidney Marion Beck, and Campbell Moore Gilmour, both of Moscow, Idaho, assignors to Idaho Research Foundation, Inc., Moscow, Idaho

Filed Oct. 16, 1975, Ser. No. 622,991
Int. Cl.² C25B 1/02, 1/04
U.S. Cl. 204—275 9 Claims



1. In an electrolytic field respirometer:

sealed sample chamber means for receiving an oxygen-consuming biological sample;

means located within the sample chamber means for absorbing carbon dioxide;

sealed compensating chamber means located physically proximate to said chamber means so as to be subjected to environmental temperature and pressure variations substantially identical to those to which the sample chamber means is subjected;

electrolytic cell means for maintaining a constant oxygen atmosphere within the sample chamber means, said electroltyic cell means comprising:

a. an enclosed vessel containing a volume of electrolyte capable of releasing hydrogen and oxygen when subjected to electrolysis;

b. an anode located within the vessel at a position spaced upwardly adjacent to the normal level of electrolyte within the vessel;

c. a cathode located within the vessel at an elevational position such that it is immersed within the electrolyte;

d. first outlet means for delivery of oxygen from the vessel during operation of the electrolyte cell, said first outlet means being in open communication with the interior of the enclosed vessel and having an open lower end surrounding the anode;

e. second outlet means for delivery of hydrogen during operation of the electrolytic cell, said second outlet means being in open communication with the interior of the enclosed vessel and having an open lower end surrounding the cathode;

a direct current supply having positive and negative terminals respectively connected to the anode and cathode;

the first outlet means of the electrolytic cell being in open communication with the interior of the sample chamber means;

the interior of the enclosed vessel of the electrolytic cell being vented, at an elevation above the normal level of the electrolyte, in open communication with the interior of the compensating chamber means.

4,016,066

METHOD FOR RAPID COOLING OF THERMALLY CRACKED GASES OF HYDROCARBONS AND APPARATUS FOR CARRYING OUT THE METHOD

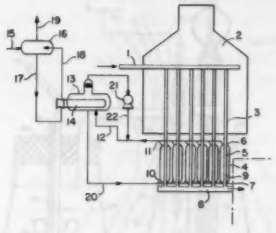
Masatoyo Shiraiwa; Ichiro Tokumitsu, both of Tokyo; Toshisada Takemura, Ichikawa; Satoshi Hatano, Kudamatsu, and Hiroshi Yamaguchi, Tokyo, all of Japan, assignors to Idemitsu Sekiyukagaku Kabushiki Kaisha (Idemitsu Petrochemical Co., Ltd.), Tokyo, Japan

Continuation of Ser. No. 393,212, Aug. 30, 1973, abandoned. This application Apr. 21, 1975, Ser. No. 569,930

Claims priority, application Japan, Aug. 31, 1972, 47-86635

Int. Cl.² C10G 9/16

U.S. Cl. 208—48 Q **3 Claims**



1. In an indirect method of rapid cooling of high temperature reaction gases containing heavy components which can form coke on heat exchanger walls and having a temperature of at least about 750° C and obtained by thermal cracking of hydrocarbons by passing said gases through a rapid cooling countercurrent flow heat exchanger cooled by a liquid heat exchange medium, the improvement comprising the steps of circulating a molten metal heat exchange medium between a cooling tank and said rapid cooling heat exchanger and introducing said molten metal medium into said rapid cooling heat exchanger countercurrently to said reaction gases at a temperature selected within the range of about 380°–550° C and above the dew point of the cokable components in said reaction gases.

4,016,067

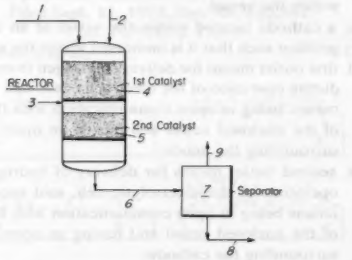
PROCESS FOR DEMETALATION AND DESULFURIZATION OF PETROLEUM OILS

Ronald H. Fischer, and Donald Milstein, both of Cherry Hill, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 21, 1975, Ser. No. 551,948

Int. Cl.² C10G 23/02, 23/16

U.S. Cl. 208—89 **9 Claims**



1. A process for catalytically demetalizing and desulfurizing a residual oil, said process consisting essentially of: passing a mixture of hydrogen and said oil at a hydrogen pressure of about 500 to 3,000 psig, a temperature of about 600° to 850° F, and a space velocity of 0.1 to 5.0 LHSV, through a trickle bed of first catalyst, said first catalyst comprising the oxides or sulfides of a Group VIB metal and an iron group metal on a support comprising a delta or theta phase alumina, said first catalyst having also at least about 60 percent of its pore volume in pores with diameters of about 100 to 200A, at least about 5 percent of its pore volume in pores greater than 500A., and a surface area of up to about 110 m^2/g; and then passing said mixture of hydrogen and said oil through a bed of second catalyst disposed downstream of said first catalyst, said second catalyst comprising the oxides or sulfides of a Group VIB metal and an iron group metal on an alumina support, said second catalyst having a surface area of at least 150 m^2/g and at least 50 percent of its pore volume in pores with diameters of 30 to 100A.

4,016,068

CATALYTIC REFORMING WITH AN ACTIVATED BIMETALLIC CATALYTIC COMPOSITE

Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 482,708, June 21, 1974, Pat. No. 3,968,053, which is a division of Ser. No. 406,134, Oct. 12, 1973, Pat. No. 3,864,241, which is a continuation-in-part of Ser. No. 187,579, Oct. 7, 1971, abandoned, which is a continuation-in-part of Ser. No. 807,910, March 17, 1969, Pat. No. 3,740,328. This application June 10, 1976, Ser. No. 694,872

Int. Cl.² C10G 35/08

U.S. Cl. 208—139 **9 Claims**

1. A process for catalytically reforming a gasoline fraction, which process comprises contacting the gasoline fraction and a hydrogen stream at reforming conditions with an activated catalytic composite comprising a combination of a platinum group component, a tin component and a halogen component with a porous carrier material in amounts sufficient to result in a catalyst containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.01 to about 5 wt. % tin and about 0.1 to about 3.5 wt. % halogen; wherein the tin component is uniformly dispersed throughout the porous carrier material in a particle size less than 100 Angstroms in maximum dimension and in a positive oxidation state; and wherein the catalytic composite has been activated by contacting with an activating gas comprising oxygen and a halogenating component selected from the group consisting of halogen and hydrogen halide at a temperature between 700°to 1100° F. for a time of at least 0.5 to about 10 hours and, thereafter, reduced by contacting the resulting activated catalytic composite with a substantially water-free reducing agent at reduction conditions selected to reduce substantially all of the platinum group component to the elemental metallic state while maintaining substantially all of the tin component in an oxidation state above that of the elemental metal.

4,016,069

MULTIPLE STAGE HYDRODESULFURIZATION PROCESS INCLUDING PARTIAL FEED OIL BY-PASS OF FIRST STAGE

Robert D. Christman; Jordan S. Lasher; John A. Paraskos, all of Pittsburgh, and Stephen J. Yanik, Valencia, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

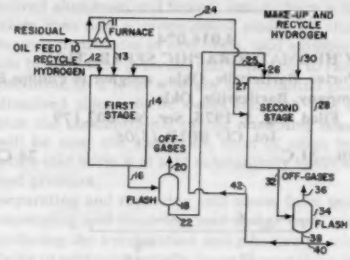
Filed Nov. 17, 1975, Ser. No. 632,375

Int. Cl.² C10G 23/02

U.S. Cl. 208—210 **7 Claims**

1. A process for hydrodesulfurization of a metal- and sulfur-containing asphaltenic feed oil comprising passing said oil and hydrogen downwardly through both first and second catalytic hydrodesulfurization stages in series, the catalyst in said stages comprising supported sulfided Group VI-B and Group VIII metals, said stages operated at a temperature of 600° to 790° F. and a hydrogen pressure of 500 to 5,000 psi, flashing con-

taminant gases including hydrogen sulfide and ammonia from the oil flowing between said stages, and concomitantly by-



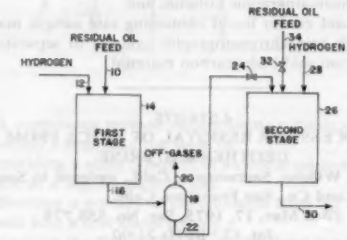
passing a portion of said feed oil around said first stage and charging it directly into said second stage.

4,016,070

MULTIPLE STAGE HYDRODESULFURIZATION PROCESS WITH EXTENDED DOWNSTREAM CATALYST LIFE

Robert D. Christman; Jordan S. Lasher; John A. Paraskos, all of Pittsburgh, and Stephen J. Yanik, Valencia, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Nov. 17, 1975, Ser. No. 632,376
Int. Cl.² C10G *23/02*
U.S. Cl. 208—210 **3 Claims**



1. A process for hydrodesulfurization of residual feed oil comprising passing said oil and hydrogen downwardly through both first and second fixed bed catalytic hydrodesulfurization zones in series at a temperature of 600° and 900° F. and a hydrogen pressure of 500 to 5,000 psi, the catalyst in said zones comprising supported Group VI-B and Group VIII metals, flashing contaminant gases including hydrogen sulfide and ammonia from the oil flowing between said first and second zones, increasing the temperature in said zones to compensate for catalyst activity loss with increasing catalyst age, teminating said flow of said feed oil to said first zone when said second stage catalyst becomes substantially deactivated, and then directly charging said feed oil downwardly through said second zone thereby extending the operable life of said substantially deactivated second stage catalyst.

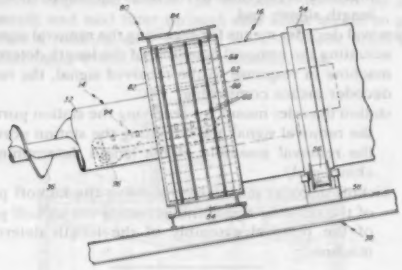
4,016,071

MAGNETIC SEPARATION APPARATUS

Malcolm M. Paterson, Atkinson, N.H., assignor to Raytheon Company, Lexington, Mass.

Filed Sept. 15, 1975, Ser. No. 613,718
Int. Cl.² B03C *1/30*
U.S. Cl. 209—39 **8 Claims**

1. A materials classifier comprising a drum disposed with its longitudinal axis inclined at an angle to the horizontal, means for rotating the drum in a predetermined direction about said axis, first conveyor means for depositing mixed materials in the drum at a selected point along its length whereby the rotation of the drum will cause a tumbling action of said materials causing the materials to progressively move toward the lower end of the drum, means for directing a stream of air at relatively high velocity through the drum to entrain light materials and remove them out the upper end of the drum, magnetic means adjacent the lower end of the drum for receiving the separated heavy materials before their exit from



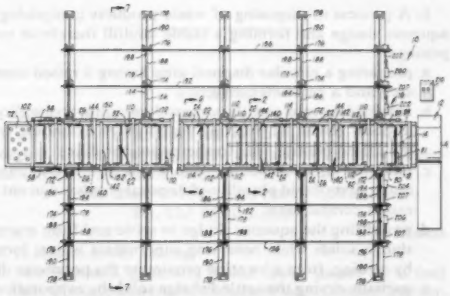
the drum and removing magnetic materials therefrom, and second conveyor means for transporting said magnetic materials out the lower end of the drum separately from the remaining nonmagnetic materials, said magnetic means comprising a magnet array having one end portion disposed externally of the drum beneath the heavy materials, said array extending upwardly along the side of the drum in the direction of rotation thereof, the opposite end portion of the array terminating above said second conveyor means, and the magnets on the individual rings being adjustable toward and away from each other to control the magnetic field produced thereby.

4,016,072

CONTROL APPARATUS FOR A LENGTH DETERMINING MACHINE

Clarence William Cavenar, Moore, Okla., assignor to W & W Steel Company, Oklahoma City, Okla.

Continuation-in-part of Ser. No. 489,107, July 17, 1974, Pat. No. 3,923,157. This application Sept. 2, 1975, Ser. No. 609,386
Int. Cl.² B07C *5/04*
U.S. Cl. 209—74 R **12 Claims**



1. A control apparatus for controlling the operation of a length determining machine having a length determining assembly comprised of an inches portion and a feet portion, and a removal assembly comprised of a station portion and a kickoff portion, the control apparatus comprising:

input means for producing a length signal comprised of an inches portion and a feet portion, and a removal signal comprised of a station portion and a kickoff portion;

length decoder means for receiving the length signal and

actuating the length determining assembly of the length determining machine in response to the received length signal, the length decoder means comprising:

inches decoder means for receiving the inches portion of the length signal and actuating the inches portion of the length determining assembly of the length determining machine in response to the received inches portion of the length signal; and,

feet decoder means for receiving the feet portion of the length signal and actuating the feet portion of the length determining assembly of the length determining machine in response to the received feet portion of the length signal; and,

removal decoder means for receiving the removal signal and actuating the removal assembly of the length determining machine in response to the received signal, the removal decoder means comprising:

station decoder means for receiving the station portion of the removal signal and actuating the station portion of the removal assembly of the length determining machine; and,

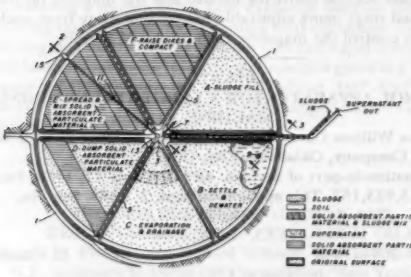
kickoff decoder means for receiving the kickoff portion of the removal signal and actuating the kickoff portion of the removal assembly of the length determining machine.

4,016,073

PROCESS FOR SLUDGE DISPOSAL AND CIRCULAR LANDFILL SYSTEM

Joseph L. Jordan, Lakewood, Colo., assignor to Dravo Corporation, Pittsburgh, Pa.

Filed Apr. 7, 1976, Ser. No. 674,433
Int. Cl.² B01D *15/00*
U.S. Cl. 210—24 **7 Claims**


A - SLUDGE FILL
B - SETTLE & DEWATER
C - EVAPORATION & DRAINAGE
D - DUMP SOLID ABSORBENT PARTICULATE MATERIAL
E - SPREAD & MIX SOLID ABSORBENT PARTICULATE MATERIAL
F - RAISE DIKES & COMPACT
SLUDGE IN
SUPERNATANT OUT
SLUDGE
SOIL
SOLID ABSORBENT PARTICULATE MATERIAL & SLUDGE MIX
SUPERNATANT
SOLID ABSORBENT PARTICULATE MATERIAL
ORIGINAL SURFACE

1. A process of disposing of waste products comprising an aqueous sludge and forming a stable landfill therefrom comprising:

a. preparing a circular disposal area having a raised central area and a perimeter dike;

b. subdividing said circular disposal area into a plurality of disposal ponds by erecting radial dikes extending from the raised central area to the perimeter dike;

c. charging aqueous sludge, from a central charging means into a first of said plurality of disposal ponds, adjacent the raised central area;

d. permitting the aqueous sludge to settle and form a settled sludge solids while removing supernatant water, formed by settling, from a location proximate the perimeter dike;

e. partially drying the settled sludge solids by evaporation of further water therefrom while mechanically disturbing any crust formed thereon to expose and aerate additional settled sludge solids;

f. depositing a quantity of solid absorbent particulate material on the partially dried sludge solids;

g. spreading the solid absorbent particulate material over the surface of the partially dried sludge solids while mechanically intermixing the two solids to form a landfill material within said disposal pond; and

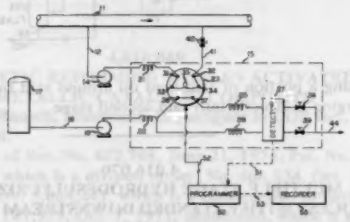
h. compacting said landfill material and raising the level of said perimeter dike and radial dikes and repeating the sequence of steps (c)–(h).

4,016,074

CHROMATOGRAPHIC SEPARATION

Grady T. Porter, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 5, 1975, Ser. No. 602,179
Int. Cl.² B01D *15/08*
U.S. Cl. 210—31 C **24 Claims**



1. A process comprising:

establishing a flow of carrier liquid, comprising a suitable ether solvent and an effective amount of water for preventing column plugging, through a packed chromatographic column suitable for separating hydrocarbon materials from an acid;

introducing a liquid sample material comprising an acid and hydrocarbon material into said carrier liquid upstream of said chromatographic column; and

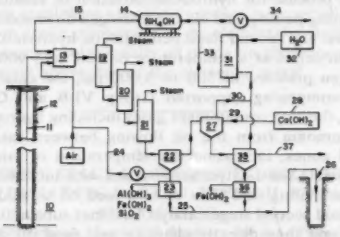
passing said carrier liquid containing said sample material through said chromatographic column to separate said acid from said hydrocarbon material.

4,016,075

PROCESS FOR REMOVAL OF SILICA FROM GEOTHERMAL BRINE

Vernon H. Wilkins, Sacramento, Calif., assignor to Southern Pacific Land Co., San Francisco, Calif.

Filed Mar. 17, 1975, Ser. No. 558,775
Int. Cl.² B01D *21/00*
U.S. Cl. 210—42 R **3 Claims**



1. In a method of recovering energy and minerals from a mixture of geothermal steam and brine produced at a high temperature and pressure from an underground formation, wherein said produced brine is to be reduced to a substantially lower temperature and pressure, said produced brine at said high temperature and pressure having a high total dissolved solids content including dissolved aluminum and ferrous ions and a high concentration of dissolved silica greater than the saturation level of silica in said brine when said brine is at said substantially lower temperature and pressure, said produced brine at said high temperature and pressure having a pH of about 5, the steps of:

a. adding ammonium hydroxide to said produced mixture of steam and brine at said high temperature and pressure and reacting said ammonium hydroxide with said dissolved aluminum and ferrous ions to form soluble ammonium ions and a precipitated sludge of aluminum and ferrous hydroxides in said brine, said ammonium hydroxide being added in an amount sufficient to raise the pH of the brine to a level wherein a substantial portion of the dissolved silica will be swept out with said sludge such that the concentration of the remaining dissolved silica will be near the saturation level of silica in said brine when said brine is at said substantially lower temperature and pressure,

b. separating and removing said steam from said brine,

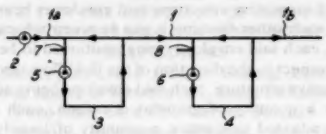
c. separating and removing said sludge from said brine,

d. reducing the temperature and pressure of said produced brine to said substantially lower temperature and pressure after the formation of said precipitated sludge.

4,016,076
PROCESSING OF EMULSIONS

Antoine Augustin Joseph Lefeuvre, Ennery, France, assignor to Societe d'Etudes et de Realisations Industrielles, Le Chesnay, France

Filed Mar. 21, 1974, Ser. No. 453,544
Claims priority, application France, Mar. 21, 1973, 73.10045; Jan. 23, 1974, 74.02173
Int. Cl.² C02B *1/18*
U.S. Cl. 210—61 **2 Claims**



1. A continuous method of processing a stable emulsion of oil-in-water comprising the steps of:

a. providing a main flowpath of an initial oil-in-water emulsion at a slightly alkaline pH,

b. diverting a portion of the emulsion from the main flowpath into a first shunt circuit,

c. injecting the first additive selected from the group consisting of salts of an alkaline earth metal at a controlled rate into said first shunt circuit,

d. joining the first shunt circuit to said main flowpath of initial emulsion thereby forming a mixture of said first additive and initial emulsion.

e. diverting a portion of the mixture formed in (d) from the main flowpath into a second shunt circuit,

f. injecting a second additive selected from the group consisting of salts of divalent and trivalent metals at a controlled rate into said second shunt circuit to cause inversion of said initial emulsion,

g. joining said second shunt circuit to the main flowpath, and

h. allowing the resultant mixture from step (g) to separate into separate layers of water and a water-in-oil emulsion.

4,016,077
BLOOD TRANSFUSION FILTERS

Gus Schreiber, 5619 W. Caruth, Dallas, Tex. 75209

Filed Aug. 25, 1975, Ser. No. 607,474
Int. Cl.² B01D *33/22*
U.S. Cl. 210—77 **6 Claims**

1. A blood filter system comprising:

a rigid frame structure;

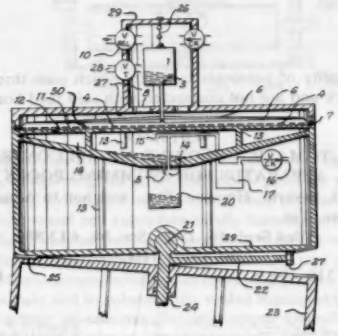
a filter support attached within said frame structure having openings therein to permit passage of blood therethrough, said filter support dividing said frame structure into an upper chamber and a lower chamber;

a filter positioned adjacent said filter support within said upper chamber;

a flexible solid sheath having its edges attached to said filter to form a collapsible blood receiving container;

seal means for sealing said solid sheath to said filter support to create a fluid-tight seal around the container formed by said sheath and said filter;

means for generating pressure in the upper chamber of said frame structure and against said solid sheath to force blood deposited within the container formed by said sheath and said filter through said filter; means to produce a rotating slow swirling wave of blood upon said filter mesh within said upper chamber, and;



collection means positioned below said filter support in the lower chamber of the frame structure to collect said blood filtered through said filter.

5. A method for filtering blood comprising:

depositing blood in a bag-like container having one surface composed for a filter mesh with the remainder of the container composed of a flexible solid sheath material;

sealing the sheath material to a filter support such that the filter is adjacent the support;

introducing blood into the container formed by the sheath material and the filter;

applying a pressure to the container opposite the filter support to force blood through the filter, and; rocking said bag-like container thereby to produce a rotating slow swirling wave of blood upon said filter mesh.

4,016,078
HEADER BLOCK FOR TUBULAR MEMBRANE PERMEATOR MODULES

George B. Clark, Clayton, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 6, 1975, Ser. No. 556,055
Int. Cl.² B01D *31/00*
U.S. Cl. 210—94 **10 Claims**

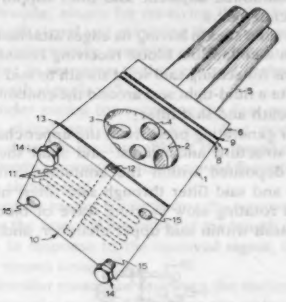
1. A header block having:

1. two opposed, generally planar faces, joined by a feed bore through said block, the axis of said bore being generally perpendicular to each of said faces;

2. a third generally planar face, to which said bore axis is generally parallel, connected to the bore and pierced by a plurality of generally parallel feed passageways terminating in said bore;

the walls defining the portions of said passageways adjacent said third face being adapted to receive, position and, in cooperation with suitable sealing means, to sealingly engage terminal portions of tubes inserted therein; and

3. a fourth generally planar face, opposed and generally parallel to said third face and connected thereto by a



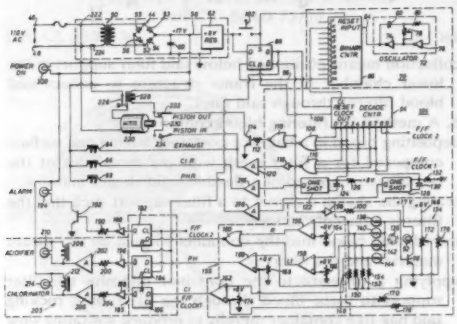
plurality of permeate conduits which pass through said block and are not connected with said feed bore.

4,016,079

AUTOMATIC CHLORINE AND PH CONTROL APPARATUS FOR SWIMMING POOLS

Ernest O. Severin, Houston, Tex., assignor to Aquasol, Inc., Houston, Tex.

Filed Sept. 16, 1975, Ser. No. 613,883
Int. Cl.² E04H *3/20*
U.S. Cl. 210—96 R **12 Claims**



1. An apparatus for automatically controlling a chlorinator supplying chlorine to water in a swimming pool, which comprises:

analyzer means having a sample cell for holding a liquid sample from a swimming pool and for producing an electrical signal functionally related to the chlorine residual in said liquid sample;

timing means including a counter operably connected to said analyzer means for generating a first set of timing signals to enable the operation of said analyzer means on a preselected periodic interval and a second set of timing signals; reagent control means for metering the introduction of chlorine reagent into the sample cell;

controller means for defining a cycle of operation and including a multistate counter receiving said second set of timing signals from said timing means, said controller means being operably connected to a motor driven plunger for drawing in and expelling liquid from the sample cell and said reagent control means to:

a. draw into and expel from the sample cell a quantity of liquid to wash out the cell during one phase of the cycle of operation,

b. draw a liquid sample and inject chlorine reagent into the sample cell during the following phase of the cycle of operation, and

c. exhaust the contents of the sample cell after a chlorine residual test has been completed;

comparator means coupled to said analyzer means for detecting the existence or non-existence of a desired level of chlorine residual in the liquid sample and for providing an output signal indicative thereof; and

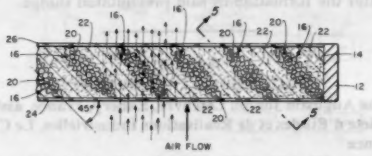
feed control means responsive to the output signal from said comparator means for regulating a chlorinator supplying chlorine to the swimming pool water.

4,016,080

FLUID FILTER AND PURIFYING APPARATUS

Douglas J. Williams, 25569 Langston St., Valencia, Calif. 91355

Filed Aug. 14, 1975, Ser. No. 604,884
Int. Cl.² B01D *23/10*
U.S. Cl. 210—284 **8 Claims**



1. A fluid filter and purifying apparatus comprising:

a supportive structure;

a plurality of elongated envelopes, each said envelope terminating in a first end and a second end, each said envelope having a longitudinal axis, said envelopes connected to said supportive structure, said envelopes being spaced from each other forming a gap between adjacent envelopes, each said envelope being positioned to be inclined with respect to the direction of the fluid flow through said supportive structure, each said envelope being adapted to retain a quantity of granulated carbon, each said gap being adapted to contain a quantity of loosely packed fibrous material; and

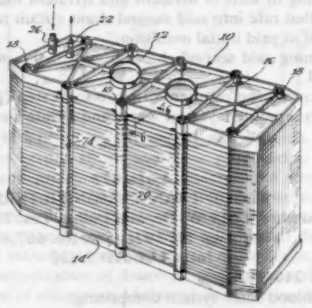
an open mesh screening placed across said supportive structures and attached to both the front side and the back side of said supportive structure, thereby sandwiching therebetween said carbon containing envelope and said fibrous material.

4,016,081

STAGED MEMBRANE DIFFUSION DEVICE AND MEMBRANE SUPPORT

F. Jesus Martinez, Palatine, and William J. Schnell, Arlington Heights, both of Ill., assignors to Baxter Laboratories, Inc., Deerfield, Ill.

Filed Apr. 22, 1974, Ser. No. 462,674
Int. Cl.² B01D *31/00*
U.S. Cl. 210—321 B **15 Claims**



1. In a diffusion device which comprises: a stack of pairs of

semi-permeable membrane walls, said pairs defining a set of first flow passages along interior surfaces of said membrane wall pairs, and plate members positioned between adjacent membrane wall pairs for support thereof, and to define a second set of flow passages along exterior surfaces of said membrane wall pairs, and means for permitting communication of said flow passages with the exterior of said device, said means including flow conduits extending transversely of said stack in communication with one set of said flow passages, the improvement comprising: staging means for directing fluid in at least one of said sets of flow passages successively along different membrane wall pairs, to lengthen the fluid flow path through said flow passages for improved diffusion, said staging means comprising intact, port-free surfaces of membrane walls in registry with said transversely extending flow conduits, positioned to occlude flow at predetermined intervals along said transversely extending flow conduits and to redirect flow received from along one membrane wall pair along another membrane wall pair.

4,016,082

DEVICE FOR THE DIFFUSION OF SUBSTANCES BETWEEN TWO FLUIDS VIA SEMI-PERMEABLE DIAPHRAGMS

Gerhard Riede, Eslov, and Gunnar Boberg, Lund, both of Sweden, assignors to Gambro AG, Baar, Switzerland

Filed Mar. 24, 1975, Ser. No. 561,221

Claims priority, application Sweden, Apr. 16, 1974, 7405033

Int. Cl.² B01D *31/00*

U.S. Cl. 210—321 B **6 Claims**

1. A dialysis apparatus comprising a plurality of stacked plates each having a substantial open area intermediate the sides and ends thereof, pairs of semi-permeable membranes disposed between adjacent spacing plates and extending over the open area therein, each spacing plate being disposed alternately between said pairs of membranes, said stack of spacing plates and pairs of membranes being provided with holes therethrough adjacent the ends thereof for forming distributing passages extending transversely of the stack of spacing plates and pairs of membranes for providing an inlet and outlet for a purifying liquid along the outside of each pair of membranes and for providing an inlet and outlet for a liquid to be purified between the membranes of each pair of membranes, the membranes of each pair being sealed together at spaced areas to form tortuous passageways between each pair of membranes at least in those areas corresponding to the open area of said spacing plates, the marginal edges of the holes forming the inlet and outlet for the purifying liquid of each pair of membranes being sealed together for preventing access of the purifying liquid from the distributing passages therefor into the liquid to be purified between the membranes of each pair and means for preventing leakage of the liquid to be purified from the distributing passages therefore into the purifying liquid.

4,016,083

SPIRALLY-WOUND MEMBRANE-TYPE SEPARATOR MODULE CAPABLE OF REVERSING THE DIRECTION OF LIQUID FLOW

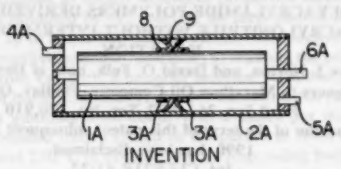
Yasuhiro Sakaguchi, Yokohama; Junichi Koike, Ohimachi, and Takehisa Kubo, Ohmiya, all of Japan, assignors to Daicel, Ltd., Osaka, Japan

Filed Dec. 15, 1975, Ser. No. 640,754

Claims priority, application Japan, Dec. 18, 1974, 49-153344

Int. Cl.² B01D *31/00*

U.S. Cl. 210—433 M **4 Claims**



INVENTION

1. An apparatus for semi-permeable membrane separation processes, comprising: an outer cylindrical pressure vessel; a spirally-wound cylindrical membrane module disposed within said pressure vessel and extending axially therein, said module being radially spaced from said pressure vessel; seal means disposed in the space between said module and said pressure vessel, said seal means including an inner ring portion sleeved on said module and in substantially sealed relationship therewith and a pair of concave flange portions extending outwardly from the ring portion into substantially sealed relationship with the inner surface of said pressure vessel, the concavities of said flange portions opening toward opposite axial ends of said pressure vessel.

4,016,084

ZOSTERA SEAWEED ARTICLES AND METHODS OF PREPARING AND UTILIZING SAME

Angelo M. Primo, 35053 Turner, Sterling Heights, Mich. 48077

Filed Feb. 14, 1975, Ser. No. 550,116

Int. Cl.² C09K *3/28;* **B27K** *9/00*

U.S. Cl. 252—8.1 **10 Claims**

1. A flame-retardant product consisting essentially of:

a predetermined quantity and arrangement of an aquatic plant belonging to the genus Zostera;

said aquatic plant being dried;

said dried aquatic plant being then reduced to form small particles thereof; and

said small particles of said dried aquatic plant being then admixed with a carrier.

4,016,085

PRODUCTION OF HETEROPOLYSACCHARIDE BY FERMENTATION OF METHANOL

Robert K. Finn; Alex L. Tannahill, both of Ithaca, N.Y., and Joseph E. Laptewicz, Jr., Groton, Conn., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Division of Ser. No. 523,559, Nov. 14, 1974, Pat. No. 3,932,218, which is a division of Ser. No. 364,559, May 29, 1973, Pat. No. 3,923,782. This application July 2, 1975, Ser. No. 592,603

Int. Cl.² C09K *7/02;* **E21B** *43/22*

U.S. Cl. 252—8.5 C **5 Claims**

1. A method of thickening an aqueous composition which comprises adding to said composition from 0.1 to 3.0% by weight of an heteropolysaccharide of bacterial origin having an intrinsic viscosity in the range of about 10 to 20 deciliters per gram and comprising the following constituents on a weight per cent basis:

1. Organic matter of 60 to 90% comprising

a. 10 to 30% glucose;
b. 3 to 15% mannose;
c. 3 to 15% galactose; and
d. 5 to 35% pyruvic acid;

2. Inorganic matter of 10 to 40% comprising
a. 5 to 25% phosphates; and
b. 5 to 25% cations.

4,016,086

POLYACRYLAMIDE POLYMERS DERIVED FROM ACRYLONITRILE WITHOUT INTERMEDIATE ISOLATION

Charles J. Norton, and David O. Falk, both of Denver, Colo., assignors to Marathon Oil Company, Findlay, Ohio

Filed Jan. 26, 1972, Ser. No. 220,910

The portion of the term of this patent subsequent to July 24, 1990, has been disclaimed.

Int. Cl.² E21B *43/22*

U.S. Cl. 252—8.55 D **5 Claims**

1. In a process for the recovery of petroleum from formations by injecting aqueous solutions of viscosity-increasing compositions into the formation and displacing same therethrough to recover petroleum from the formation, the improvement comprising in combination:

a. hydrolyzing acrylonitrile by treatment with sulfuric acid and water in the presence of a polymerization inhibitor to form acrylamide monomer,
b. neutralizing the acrylonitrile hydrolysis product by treatment with base,
c. substantially removing the polymerization inhibitor from the acrylonitrile hydrolysis product,
d. polymerizing the hydrolyzed and neutralized acrylonitrile solution at a temperature in the range of about 10° to about 90° C in the presence of a polymerization catalyst to form polyacrylamide, having a molecular weight of about 1 million to about 100 million,
e. methylolating the polyacrylamide with about 0.01 to about 10 moles of formaldehyde per mole of acrylamide monomer unit, and thereafter injecting the polyacrylamide into the formation and displacing it into the formation to recover crude oil therefrom.

4,016,087

SURFACE TREATING AGENT FOR PROCESSING OF METALS

Uraji Narushima, Yokohama, and Takashi Moriwake, Kawasaki, both of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed July 3, 1975, Ser. No. 593,043

Claims priority, application Japan, July 8, 1974, 49-78591

Int. Cl.² C10M *3/22*

U.S. Cl. 252—40.7 **7 Claims**

1. A surface treating agent for processing of metals, which comprises (A) a water-soluble thermoplastic synthetic resin having a glass transition temperature of 60° to 90° C and an average molecular weight of 15,000 to 50,000 which is obtained by copolymerizing (1) 16 to 40 parts by weight of an ester of acrylic acid with a monovalent aliphatic alcohol having 1 to 8 carbon atoms, (2) 40 to 64 parts by weight of a mixture of styrene and at least one member selected from the group consisting of methyl methacrylate, vinyl acetate and acrylonitrile wherein the mixture of styrene and the other monomer is in a proportion of 1:0.8 to 0.8:1 by weight, and (3) 10 to 20 parts by weight of a polymerizable hydrocarbyl carboxylic acid, (B) a metallic soap which is a salt of a higher fatty acid having 8 to 22 carbon atoms with an alkaline earth metal, and (C) water, said water-soluble thermoplastic synthetic resin (A) and the metallic soap (B) being contained in a ratio of 5:4 to 5:1 by weight and wherein the total concentration of component (A) and component (B) in water (C) is 50% by weight or less.

4,016,088

HYDRAULIC FLUIDS

Gerald John Joseph Jayne; Herbert Frank Askew, and Colin John Harrington, all of Swindon, England, assignors to Castrol Limited, England

Division of Ser. No. 508,842, Sept. 24, 1974. This application July 22, 1975, Ser. No. 598,010

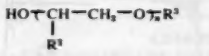
Claims priority, application United Kingdom, Sept. 25, 1973, 44905/73; Dec. 14, 1973, 58175/73

Int. Cl.² C10M *3/46, 3/44*

U.S. Cl. 252—78.3 **18 Claims**

1. An essentially chlorine free hydraulic fluid containing alkyl silane derivatives in an amount up to 99% by weight, the remainder being selected from conventional hydraulic fluid additives, conventional hydraulic fluid base stocks and mixtures thereof, said alkyl silane derivatives being prepared by a process which comprises reacting a di- or tri-chlorosilane of the formula:

with a diol or polyol and a glycol monoether of the formula:



wherein:

a. R is an alkyl group;
b. the or each group R^2 is a hydrogen atom or a methyl or ethyl group and each R^2 may be the same as or different from any other group R^2;
c. R^3 is an alkyl group;
d. *n* is an integer of from 1 to 10; and
e. X is a chlorine atom or the group R.

4,016,089

DENTURE CLEANING CONCENTRATE

Glen B. Regan, and Barrier F. Regan, both of 727 Shasts St., Redwood City, Calif. 94063

Filed Nov. 11, 1974, Ser. No. 522,328

Int. Cl.² C11D *1/62, 3/40, 3/48*

U.S. Cl. 252—106 **2 Claims**

1. A denture cleaning concentrate consisting essentially of an aqueous solution containing 4 to 10 percent by weight of orthophosphoric acid, 3.5 to 5 percent by weight of a water soluble alkyl phenyl polyglycolether, 0.5 to 1.0 percent by weight of a quaternary ammonium germicide containing one

alkyl group of 10 to 20 carbon atoms and three lower organic radicals selected from the group consisting of methyl, ethyl and benzyl and 0.003 to 0.01 percent by weight of a chemical indicator for pH which undergoes a color change at pH about 4.5.

4,016,090

STABLE BLEACHING COMPOSITION

Yunosuke Nakagawa, Koshigaya, and Koitsu Sato, Funabashi, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Feb. 28, 1975, Ser. No. 554,012
Claims priority, application Japan, Mar. 6, 1974, 49-25995
Int. Cl.² C11D 7/54
U.S. Cl. 252—102 2 Claims

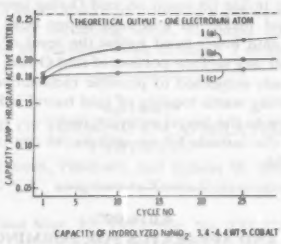
1. A dry, powder form, bleaching composition having an improved storage stability, consisting essentially of: from 5 to 90 percent by weight of sodium percarbonate; from one to 40 percent by weight of an activator for said sodium percarbonate and capable of increasing the bleaching effect of said sodium percarbonate in aqueous solution at a temperature below 80° C; and from 5 to 40 percent by weight of anhydrous potassium carbonate.

4,016,091

METHOD OF PREPARING HIGH CAPACITY NICKEL ELECTRODE POWDER

John F. Jackovitz, Monroeville, and Earl A. Pantier, Verona, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 558,110, March 13, 1975, Pat. No. 3,941,614. This application Oct. 30, 1975, Ser. No. 627,330
The portion of the term of this patent subsequent to Mar. 2, 1993, has been disclaimed.
Int. Cl.² H01M 4/88
U.S. Cl. 252—182.1 5 Claims



1. A method of making an active battery electrode powder, comprising the steps of:

a. mixing an admixture of NiO and Na_2O_2, wherein the weight ratio of NiO: Na_2O_2 is between about 1:1.35 to about 1:2.1;

b. heating the admixture at a reaction temperature of between about 800°–1150° C, for about ½ hour to 8 hours to melt the admixture and form a reaction product comprising $NaNiO_2$;

c. hydrolyzing the reaction product comprising $NaNiO_2$ in water at between 20°–95° C, forming a battery material comprising Ni hydroxide forms and then washing the battery material; and

d. maintaining the activity of the battery material by maintaining the temperature of the material below about 65° C.

4,016,092

ORGANIC COMPOSITIONS CONTAINING BORATE AND PHOSPHONATE DERIVATIVES AS DETERGENTS

Harry J. Andress, Wenonah, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 563,240, March 28, 1975, abandoned. This application Mar. 8, 1976, Ser. No. 664,853
Int. Cl.² C10M 1/46, 1/44, 1/54; C07F 5/04
U.S. Cl. 252—32.5 11 Claims

1. An organic fluid composition comprising an organic medium selected from the group consisting of lubrication oils, greases, distillate fuel oils, mineral oil heat-exchange fluids and petroleum base power transmission fluids, and a minor amount, sufficient to impart detergent properties thereto, of the product obtained by (a) reacting an alkyl phenol having from about 20 to about 300 carbon atoms, formaldehyde and trishydroxymethylaminomethane and (b) reacting the product produced from (a) with a member selected from the group consisting of boric acid, dialkyl phosphonates and diaryl phosphonates in amounts from about 1 to 2 moles per mole of product produced from (a) and at temperatures from about 50° C to about 250° C to produce the corresponding borate or phosphonate derivatives.

9. The product obtained by (a) reacting an alkyl phenol having from about 20 to about 300 carbon atoms, formaldehyde and trishydroxymethylaminomethane and (b) reacting the product produced from (a) with a member selected from the group consisting of boric acid, dialkyl phosphonates and diaryl phosphonates in amounts from about 1 to 2 moles per mole of product produced from (a) and at temperatures from about 50° C to about 250° C to produce the corresponding borate or phosphonate derivatives.

4,016,093

METAL ALKYLPHENATE SULFIDES OF REDUCED CORROSIVENESS AND METHOD OF PREPARING SAME

Emil Koft, Jr., Woodbury Heights, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 19, 1976, Ser. No. 668,765
Int. Cl.² C10M 1/54
U.S. Cl. 252—42.7 19 Claims

1. A process for preparation of a metal alkylphenate sulfide which provides reduced corrosivity to metals comprising the steps of (1) reacting an alkylphenol sulfide with a minor amount of a basic material selected from the group consisting of an amine having the formula RNH_2, RR'NH or RR'R''N wherein R, R' and R'' are the same or different alkyl group of from 1 to about 20 carbon atoms, an alkylene polyamine having the formula $H_2N(C_mH_{2m}NH)_z—C_mH_{2m}NH_2$ wherein m is an integer of 2 or 3 and z is 0 or an integer of from 1 to 10 and a cyclic amine at a temperature of from about 100° C to about 250° C, (2) subjecting the reaction mixture of step (1) to steam sparging, carbonation, air sparging or a combination thereof at a temperature of from about 100° C to about 250° C, (3) reacting the product of step (2) with an alkaline earth metal oxide or hydroxide in the presence of an alcohol and carbon dioxide at a temperature of from about 10° C to about 70° C and (4) subjecting the product of step (3) to steam sparging, carbonation, air sparging or a combination thereof.

18. The reaction product prepared by the process of claim 1.

19. The fluid organic composition comprising a major proportion of an organic lubricant, fuel or transmission fluid and a minor proportion sufficient to provide detergent, antioxidant or improved corrosion properties thereto of the reaction product of claim 18.

4,016,094

ELECTRO-OPTICAL DEVICE

Masahide Tsukamoto, Neyagawa; Tetsuro Ohtsuka, Takatsuki; Kazuhisa Morimoto, Settsu, and Yoshinobu Murakami, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

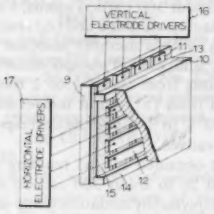
Filed Mar. 17, 1975, Ser. No. 559,394

Claims priority, application Japan, June 7, 1974, 49-65287; June 7, 1974, 49-65288; June 10, 1974, 49-66404; June 11, 1974, 49-66904

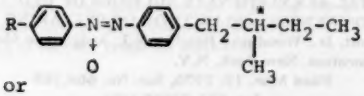
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 20, 1976

Int. Cl.² G02F 1/16; C09K 3/34; G02F 1/13

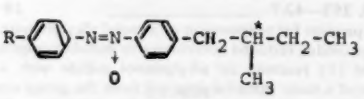
U.S. Cl. 252—299 7 Claims



1. In an electro-optical device having a cell for containing a liquid crystal and consisting of two light-transparent plates opposed to each other and having electrically conductive electrodes on the inner surfaces thereof, the electrodes on at least one inner surface being light-transparent and spacer means between said opposed electrodes; and a power supply coupled to said electrodes for applying an electric voltage to said electrodes, the improvement comprising a liquid crystal in said cell between said electrodes consisting of 99.9 to 30 wt. % of at least one nematic liquid crystal and 0.1 to 70 wt. % of at least one optically active liquid crystal compound of the formula;



or



wherein R is a methoxy, ethoxy, propoxy or butoxy radical.

4,016,095

SOURCE OF IONIZING RADIATION

Tristan Silovanovich Ambardanishvili, territoriya ippodroma, korpus 4, kv. 38; Vakhtang Justinovich Dundua, territoriya ippodroma, korpus 4, kv. 25, and Mikhail Alexandrovich Kolomiitsev, ulitsa Ozhio, 7, all of Tbilisi, U.S.S.R.

Filed May 1, 1973, Ser. No. 356,194

Int. Cl.² G21G 4/00

U.S. Cl. 252—301.1 R 11 Claims

1. An ionizing radiation source comprising a moulded and hardened composition based on a phenol-aldehyde resin and a radioactive material uniformly distributed in said resin, said radioactive material forming a chemical bond with the hydroxyl groups of the phenol-aldehyde resin to form a uniform distribution of the radioactive material throughout said resin, said radioactive material forming a solid molecular solution in said resin so as to be ionically and molecularly dispersed in said resin without formation of its own thermodynamic phase.

4,016,096

METHOD AND DEVICE FOR CLOSING A RECEPTACLE FOR RADIOACTIVE WASTES

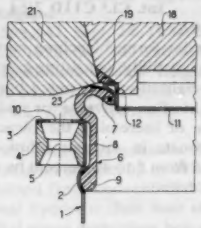
André Meyer, Le Plessis Robinson, France, assignor to Groupement pour les Activities Atomiques et Advancees "GAAA", Le Plessis Robinson, France

Filed Sept. 12, 1975, Ser. No. 612,963

Claims priority, application France, Oct. 2, 1974, 74.33190; Dec. 6, 1974, 74.30051

Int. Cl.² G21F 5/00

U.S. Cl. 252—301.1 W 4 Claims



1. A method for closing a cylindrical barrel for holding radioactive waste during the loading thereof, said barrel including an inside lid and an outside lid separated by an O-ring having two beads, said method comprising:

arranging on the top rim of the barrel, on the internal side thereof, said O-ring with beads at upper and lower positions said beads facing respectively towards and away from the interior of said barrel;

resting the inside lid on the upper bead bringing said O-ring into contact with an annular waste discharge port external of said inside lid;

orienting said barrel coaxially beneath the waste discharge port for waste discharge thereinto;

lifting said inside lid axially from said O-ring and said annular ring and filling said barrel with said waste;

resting the inside lid again on said O-ring upper bead;

driving said inside lid and said upper bead downwardly toward said lower bead below the level of said top rim such that any surface portion of said O-ring seal between said beads subjected to possible radioactive contamination during waste loading of said barrel is blocked from exposure to the barrel exterior; and

installing the outside lid on said barrel rim overlying said inside lid.

4,016,097

PROCESS AND APPARATUS FOR FORMING SILICATE PRODUCTS

Fred Smith, Norwich, England, assignor to Anglian Water Authority, Huntingdon, England

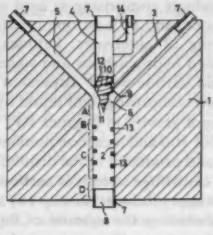
Filed Oct. 22, 1975, Ser. No. 624,816

Int. Cl.² B01J 13/00

U.S. Cl. 252—313 S 12 Claims

1. A process in which a stable aqueous dispersion of a complex alkali metal-aluminium-silicate having a pH of 3 to 7.5, which contains up to 5% silicate, measured as SiO_2, and which is soluble in hydrochloric acid, is prepared by mixing an aqueous solution of alkali metal silicate and an aqueous solution of an aluminium salt in apparatus comprising a mixing tube, at least two inlets through which aqueous streams can pass into one end of the tube, and an outlet at the other end of the tube, the process being characterised in that the bulk of the water is supplied to the tube through a first said inlet, the

aqueous solution of alkali metal silicate is supplied through a second said inlet, and the aqueous solution of an aluminium salt is supplied either through said first inlet or a third said inlet, the aqueous streams from each inlet are constrained to



pass in a generally helical path along the tube by stationary means positioned in the tube, and the aqueous dispersion is removed through the outlet at a pressure which is at least 40 psi lower than the pressure at the inlet through which the bulk of the water is supplied.

4,016,098

PROCESS FOR HARDENING MICROCAPSULES

Keiso Saeki, and Hiroharu Matsukawa, both of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Dec. 13, 1974, Ser. No. 532,573

Claims priority, application Japan, Dec. 13, 1973, 48-140965

Int. Cl.² B01J *13/02*

U.S. Cl. 252—316 **12 Claims**

1. In a process for producing microcapsules by complex coacervation to microencapsulate hydrophobic oil droplets within a gelled coacervate wall, said process utilizing as the coacervate wall material at least two hydrophilic colloids having opposite electric charges and being ionizable in water, at least one of said colloids being gellable, the improvement comprising

a. subsequently to the formation of said gelled coacervate wall encapsulating said hydrophobic oil droplets, hardening said coacervate wall by contacting said coacervate wall with an oxidation product of a polysaccharide and

b. during said hardening stage, adjusting the pH of the system to an alkaline value of about 7 or above.

4,016,099

METHOD OF FORMING ENCAPSULATED TONER PARTICLES

Russel E. Wellman, Pittsford, and Robert W. Brown, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 27, 1972, Ser. No. 238,528

Int. Cl.² B01J *13/02*

U.S. Cl. 252—316 **16 Claims**

1. A method of forming encapsulated toner particles comprising:

a. Forming a dispersion of core material in a solution of wall material in a solvent by dissolving said core material and said wall material in a solvent to form a solution and effecting preferential phase-separation of said core material from said solution, said dispersion also containing a colorant selected from the group consisting of dyes and pigments and mixtures thereof dispersed therein;

b. Drowning said dispersion in at least one liquid which is miscible with the solvent and in which at least the wall material is substantially insoluble to effect phase-separation of said wall material forming a dilute dispersion of particles comprising said core material encapsulated with said wall material in said liquid and;

c. Recovering said colored encapsulated toner particles from said liquid.

4,016,100

METHOD OF PREPARING A CONTROLLED RELEASE LIQUID PHARMACEUTICAL COMPOSITION

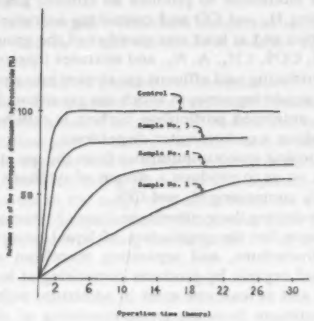
Akira Suzuki, Takatsuki; Hiroshi Miura, Neyagawa; Saburo Matsuda, Kyoto, and Takashi Ohsawa, Ibaragi, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Filed Jan. 26, 1976, Ser. No. 652,212

Claims priority, application Japan, Jan. 27, 1975, 50-11751

Int. Cl.² B01J *13/02*; **A61K** *9/52*

U.S. Cl. 252—316 **11 Claims**



1. A method of preparing a controlled release pharmaceutical composition, which comprises the steps of dispersing a phospholipid uniformly in water to give an aqueous phospholipid dispersion having lipid spherules, adding a medicament to the aqueous phospholipid dispersion to form a medicament dispersion, freezing said medicament dispersion thereby entrapping the medicament in the lipid spherules, and then thawing the frozen dispersion to give an aqueous suspension of the medicament entrapped in said lipid spherules, said spherules having a diameter of less than 5.0 μ.

4,016,101

PROCESS AND COMPOSITION FOR BREAKING EMULSIONS

Sheldon B. Markofsky, Olney, and Louis L. Wood, Rockville, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 423,503, Dec. 10, 1973, Pat. No. 3,993,615. This application Mar. 11, 1976, Ser. No. 665,748

Int. Cl.² B01D *17/04*

U.S. Cl. 252—344 **24 Claims**

1. A process for breaking a water-in-oil emulsion or an oil-in-water emulsion comprising subjecting the emulsion to the demulsifying action of a demulsifying composition formed by: (a) preparing a water soluble polyurea having at least 1 amino group per molecule by admixing and reacting in a liquid ketone or aldehyde having at least 2 carbon atoms per molecule; (i) a polyisocyanate; and (ii) a polyamine having at least 3 amino nitrogen atoms per molecule with at least 2 of the amino nitrogens being bonded to hydrogen atoms; and (b) forming a water soluble quaternary ammonium polymer by reacting said water soluble polyurea with an alkylating agent, and separating the resulting oil and water phases of the broken aqueous emulsion, the demulsifying composition being present in an amount effective for breaking the aqueous emulsion.

4,016,102

RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS

Charles P. Marion, Mamaroneck, N.Y., assignor to Texaco Development Corporation, New York, N.Y.

Division of Ser. No. 535,606, Dec. 23, 1974, Pat. No. 3,980,591. This application Apr. 30, 1976, Ser. No. 681,940
Int. Cl.² C01B 2/14
U.S. Cl. 252—373 **20 Claims**

1. A method for producing clean synthesis gas for the oxo or oxyl process comprising

1. reacting by partial oxidation a hydrocarbonaceous fuel or a slurry of solid carbonaceous fuel with substantially pure oxygen in the reaction zone of a free-flow noncatalytic synthesis gas generator at a temperature in the range of about 1300° to 3500° F and a pressure in the range of about 1 to 300 atmospheres in the presence of a temperature moderator to produce an effluent gas stream comprising H_2 and CO and containing entrained particulate carbon and at least one member of the group CO_2, H_2O, H_2S, COS, CH_4, A, N_2, and mixtures thereof;
2. introducing said effluent gas stream into gas cooling and gas scrubbing zones in which the gas stream is cooled and the entrained particulate carbon is removed, so as to produce a carbon-water dispersion;
3. removing gaseous impurities from the gas stream leaving (2), so as to produce a stream of synthesis gas substantially comprising H_2 and CO;
4. introducing the synthesis gas from (3) into an oxo or oxyl process for the production of liquid oxygen containing hydrocarbons, and separating therefrom a mixture of liquid organic by-products comprising at least one alcohol and at least one ester in admixture with at least one constituent from the group consisting of aldehydes, ketones, ethers, acids, olefins, saturated hydrocarbons, and water;
5. contacting said carbon-water dispersion from (2) with a liquid organic extractant comprising the aforesaid mixture of liquid organic by-products from (4) in an amount sufficient to render all of the carbon particles in said carbon-water dispersion hydrophobic and to resolve said carbon-water dispersion; and
6. by decanting, separately removing in a separating zone a stream of clarified water and a pumpable dispersion having a carbon content of about 0.5 to 5 weight % and comprising said carbon particles and said liquid organic extractant; and wherein said separating zone is at a temperature in the range of 180° to 700° F and a pressure sufficient to maintain both the extractant and water in liquid phase.

4,016,103

RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS

Charles P. Marion, Mamaroneck, N.Y., assignor to Texaco Development Corporation, New York, N.Y.

Division of Ser. No. 535,607, Dec. 23, 1974, Pat. No. 3,980,592. This application Apr. 30, 1976, Ser. No. 681,942
Int. Cl.² C01B 2/14
U.S. Cl. 252—373 **9 Claims**

1. A method for continuously producing clean synthesis gas for the oxo or oxyl process comprising:

1. reacting by partial oxidation a hydrocarbonaceous fuel or slurry of solid carbonaceous fuel with a free-oxygen containing gas in the reaction zone of a free-flow noncatalytic synthesis gas generator at a temperature in the range of about 1300° to 3500° F and at a pressure in the range of about 1 to 300 atmospheres in the presence of a temperature moderator to produce an effluent gas stream comprising H_2 and CO and containing entrained particulate carbon and at least one member of the group CO_2, H_2O, H_2S, COS, CH_4, A, and N_2;
2. introducing said effluent gas stream into gas cooling and gas scrubbing zones in which the gas stream is cooled and contacted with water, effecting the removal of said particulate carbon from said effluent gas stream and producing a carbon-water dispersion;
3. removing gaseous impurities from the gas stream leaving (2) producing a stream of synthesis gas substantially comprising H_2 and CO;
4. introducing the synthesis gas from (3) into an oxo or oxyl process and separating therefrom a mixture of liquid organic by-products comprising at least one alcohol and at least one ester, and at least one constituent from the group consisting of aldehydes, ketones, ethers, acids, olefins, saturated hydrocarbons and water;
5. contacting said carbon-water dispersion with liquid organic extractant comprising light liquid hydrocarbon fuel fraction having a gravity in degrees API in the range of over 20 to about 100 and a carbon number in the range of about 5 to 16 and produced in the distillation zone in step (7) and a thin centrifuge stream of carbon-light hydrocarbon fuel dispersion produced in step (6) after removal of any waste gas wherein the amount of liquid organic extractant introduced is sufficient to render all of the carbon particles in said carbon-water dispersion hydrophobic and to resolve said carbon-water dispersion, and by decanting removing a stream of clarified water and a separate stream of carbon-extractant dispersion having a carbon content of about 0.5 to 5 weight % in a separating zone at a temperature in the range of ambient to 700° F and a sufficient pressure to maintain said liquid organic extractant and said clarified water in liquid phase;
6. introducing said carbon-extractant dispersion from (5) into a centrifuging zone at a temperature in the range of about ambient to 700° F and a pressure in the range of about 1 to 200 atmospheres, separately withdrawing from said centrifuging zone a thick stream of carbon-extractant having a carbon content in the range of about 1 to 10 weight percent, and a comparatively thin stream of carbon-extractant having a carbon content in the range of about 0.02 to 1.0 weight percent; degasifying said thin stream and introducing said stream into (5) as a portion of said liquid organic extractant, withdrawing said clarified water stream from said separating zone, optionally recycling said water to said gas-scrubbing zone in (2) to scrub carbon from the effluent gas stream from the gas generator, introducing said thick centrifuge stream of carbon-extractant in admixture with fresh heavy liquid hydrocarbon fuel having a gravity in degrees API in the range of about b −20 to 20 and in the amount of about 0.02 to 40 lbs. of fresh heavy liquid hydrocarbon fuel per lb. of light liquid hydrocarbon fuel in said thick centrifuge stream into a distillation zone; and
7. removing a light liquid hydrocarbon fuel fraction from said distillation zone and recycling same to (5) as a portion of said liquid organic extractant; removing from said distillation zone a pumpable bottoms slurry comprising particulate carbon and the unvaporized portion of said heavy liquid hydrocarbon fuel, mixing with each part by weight of said pumpable bottoms slurry about 0.01 to 99 parts by weight of said mixture of liquid organic by-products from the oxo or oxyl process in (4), and introducing same into said synthesis gas generator as at least a portion of said hydrocarbonaceous fuel.

4,016,104

RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS

Charles P. Marion, Mamaroneck, N.Y., assignor to Texaco Development Corporation, New York, N.Y.

Division of Ser. No. 535,605, Dec. 23, 1974, Pat. No. 3,980,590. This application Apr. 30, 1976, Ser. No. 681,943
Int. Cl.² C01B 2/14
U.S. Cl. 252—373 **16 Claims**

1. A method for producing clean synthesis gas for the oxo or oxyl process comprising

1. reacting by partial oxidation a hydrocarbonaceous fuel or a pumpable slurry of solid carbonaceous fuel with a free-oxygen containing gas in the reaction zone of a free-flow noncatalytic synthesis gas generator at a temperature in the range of about 1300° to 3500° F and a pressure in the

range of about 1 to 300 atmospheres in the presence of a temperature moderator to produce an effluent gas stream comprising H_2 and CO and containing entrained particulate carbon and at least one member of the group CO_2, H_2S, COS, CH_4, H_2O, A, and N_2;

2. introducing said effluent gas stream into gas cooling and gas scrubbing zones where the gas stream is cooled and scrubbed with water and the entrained particulate carbon is removed, producing a carbon-water dispersion;
3. removing gaseous impurities from the gas stream leaving (2), producing a stream of synthesis gas substantially comprising H_2 and CO having a mole ratio of about 0.9–2.0 moles of H_2 per mole of CO;
4. introducing the synthesis gas from (3) into an oxo or oxyl process for the production of oxygen containing liquid hydrocarbons, and separating therefrom a mixture of liquid organic by-products comprising at least one alcohol, at least one ester, and at least one constituent from the group consisting of aldehydes, ketones, ethers, acids, olefins, saturated hydrocarbons, and water;
5. contacting said carbon-water dispersion from (2) with a liquid organic extractant comprising said mixture of liquid organic by-products in admixture with about 0 to 25 weight % of a light liquid hydrocarbon fuel having a gravity in degrees API of 20° and higher and a carbon number in the range of about 5 to 16, wherein the amount of liquid organic extractant introduced is sufficient to render all of the carbon particles in said carbon-water dispersion hydrophobic and to resolve said carbon-water dispersion into clarified water and liquid organic extractant-carbon dispersion;
6. removing by decanting from a separating zone at a temperature in the range of 180°–700° F and a sufficient pressure to maintain said liquid organic extractant and said clarified water in liquid phases a stream of clarified water and separating therefrom substantially any dissolved water soluble constituents from said liquid organic extractant, and recycling the purified water to the scrubbing zone in step (2) as said scrubbing water, and removing a separate stream of pumpable carbon-extractant dispersion having a carbon content of about 0.5 to 5 weight percent;
7. mixing said carbon-extractant dispersion with a liquid hydrocarbon fuel having a gravity in degrees API in the range of about −20° to 100° and in the amount of about 0.02 to 40 lbs. of fresh liquid hydrocarbon fuel per lb. of extractant in said carbon-extractant dispersion and with about 0 to 0.25 lbs. of fresh mixture of said liquid organic by-products from the oxo or oxyl process per lb. of said carbon-extractant dispersion plus liquid hydrocarbon fuel, and introducing the mixture into a fractional distillation zone; and
8. removing a light fraction from said distillation zone and introducing same into (5) as at least a portion of said liquid organic extractant; removing a pumpable bottoms slurry comprising particulate carbon and the unvaporized portion of said liquid hydrocarbon fuel and any unvaporized portion of said mixture of the liquid organic by-products from the oxo or oxyl process from said distillation zone and introducing same into said synthesis gas generator as at least a portion of said fuel.

4,016,105

CATALYST PREPARATIVE METHOD

Ralph O. Kerr, Houston, Tex., assignor to Petro-Tex Chemical Corporation, Houston, Tex.

Filed Feb. 7, 1975, Ser. No. 548,163
Int. Cl.² B01J *27/18*
U.S. Cl. 252—437 **8 Claims**

1. A method for preparing a phosphorus-vanadium oxidation catalyst which comprises

adding a reducing composition comprising an organic acid or aldehyde which is oxalic acid, citric acid, formic acid, ascorbic acid, malic acid, formaldehyde or acetaldehyde and a secondary alcohol which is isopropanol, 2-butanol, 2-pentanol, 3-pentanol, 2-octanol or 6-dodecanol, to an aqueous soiution of a phosphoric acid,

heating said solution of organic acid or aldehyde, secondary alcohol and phosphroic acid to a temperature in the range of 50° to 80° C,

adding an inorganic vanadium compound which is vanadium pentoxide, ammonium metavanadate, vanadium trioxide, vanadyl chloride, vanadyl dichloride, vanadyl trichloride, vanadium sulfate, vanadium phosphate, vanadium tribromide, vanadyl formate, vanadyl oxalate, metavanadic acid or pyrovanadic acid to said aqueous solution,

maintaining the temperature of said solution in the range of 50° to 80° C,

dissolving said inorganic vanadium compound in said solution, the valence of said vanadium in solution being less than 5^+, and

recoverng a vanadium-phosphorus composition,

said reducing composition being present in stoichiometric excess of the amount necessary to reduce the vanadium present below plus 5 valency, the mole ratio of secondary alcohol to organic acid or aldehyde being in the range of 1 to 3:1, the water being present in said aqueous solution in an amount in the range of 3 to 20 times the weight of the vanadium compound and the atomic ratio of vanadium to phosphorus being the range of 1:1.12 to 1.16.

4,016,106

PREPARATION OF CATALYSTS OF PREDETERMINED PORE SIZE DISTRIBUTION AND PORE VOLUME

Willard H. Sawyer, Baton Rouge, La., and Michael T. Duncan, Pontiac, Mich., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Jan. 5, 1976, Ser. No. 646,490
Int. Cl.² B01J *21/04, 21/06, 23/24, 23/74*
U.S. Cl. 252—455 R **45 Claims**

1. In a process for the formation of a catalyst comprised of a Group VI-B or Group VIII metal, or both, composited with alumina by precipitation of an alumina hydrogel from a solution which contains a hydrous form of alumina in concentration ranging from about 1 to about 5 percent, based on the weight of the solution, and a compound having an anion which forms an alkaline soluble aluminum salt in an alkaline medium, the alumina hydrogel being precipitated from solution at temperatures ranging from about 15° F. to about 120° F. and at pH ranging from about 8 to about 12, and then separated from the solution,

the alumina hydrogel then being contacted with a solution of a water-soluble polymer containing from about 2 to about 24 monomer units from the group consisting of (a) polyethylene glycols, (b) polypropylene glycols, and (c) polyethylene amines sufficient to absorb the polymer into the pores of the alumina hydrogel and displace water from the pores until the weight ratio of polymer:alumina within the hydrogel ranges from about 0.5:1 to about 4:1,

the improvement which comprises

forming a slurry from the separated water-soluble polymer containing alumina hydrogel,

spray drying said polymer containing alumina hydrogel by countercurrent contact of an atomized spray of the alu-

mina hydrogel with air at temperature sufficient to form granules of boehmite,

forming a paste from the granules of polymer containing boehmite and water, the past containing above about 20 percent by weight of solids,

mulling said water-soluble polymer containing boehmite paste to provide a substantially homogeneous mass,

extruding said polymer containing boehmite paste through a die to form spaghetti-like extrudate shapes,

drying the spaghetti-like boehmite extrudate shapes to provide a solids content ranging from about 20 to about 30 percent,

marumerizing the spaghetti-like boehmite extrudate shapes to form spheres of average particle size ranging from about 1/50 to about ⅛ inch diameter, and calcining the marumerized spheres.

4,016,107

PREPARATION OF CATALYSTS OF PREDETERMINED PORE SIZE DISTRIBUTION AND PORE VOLUME

Willard H. Sawyer, and Harry E. Robson, both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Jan. 5, 1976, Ser. No. 646,491

Int. Cl.² B01J *21/04, 21/06, 23/24, 23/74*

U.S. Cl. 252—455 R **24 Claims**

1. In a process for preparing a catalyst from a Group VI-B or Group VIII metal, or both, composited with alumina by precipitation of an alumina hydrogel from a solution which contains a hydrous form of alumina and a compound having an anion that is soluble in an alkaline solution and forms and aluminum salt,

the improvement comprising

precipitating the hydrogel of alumina at temperatures ranging from about 15° F. to about 120° F. from the solution, which contains alumina in concentration ranging from about 1 to about 5 percent, based on the weight of solution, at pH ranging from about 8 to about 12,

separating the alumina hydrogel from the solution,

contacting the alumina hydrogel with a solution of a water-soluble polymer containing from about 2 to about 24 monomer units from the group consisting of (a) polyethylene glycols, (b) polypropylene glycols, and (c) polyethylene amines sufficient to absorb the polymer into the pores of the alumina hydrogel, displacing water from the pores until the weight rates of polmer:alumina within the hydrogel ranges from about 0.5:1 to about 4:1,

drying the polymer containing alumina hydrogel,

contacting the dried polymer containing alumina hydrogel with a solvent to extract and separate the polymer therefrom,

drying, and

calcining the hydrogel to form gamma alumina characterized as comprising,

when the catalyst is of size ranging from about 1/50 inch up to 1/25 inch average particle size diameter, at least about 15 percent of its total pore volume of absolute diameter within the range of about 150A to about 250A; when the catalyst is of size ranging from about 1/25 inch to about ⅛ inch average particle size diameter, at least about 15 percent of its total pore volume of absolute diameter within the range of about 175A to about 275A; wherein, in each of these catalysts of differing ranges of particle size distributions, the pore volumes resultant from pores of 50° A, and smaller, and minimized; the surface areas and pores volumes of the catalysts being interrelated with particle size, and pore size distributions, surface area ranging at least about 200 m^2/g to about 600 m^2/g with pore volumes ranging from about 0.8 to about 3.0 cc/g (B.E.T.).

4,016,108

PREPARATION OF CATALYSTS OF PREDETERMINED PORE SIZE DISTRIBUTION AND PORE VOLUME

Harry E. Robson, Baton Rouge, La., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Jan. 5, 1976, Ser. No. 646,492

Int. Cl.² B01J *21/04, 21/06, 23/24, 23/74*

U.S. Cl. 252—455 R **15 Claims**

1. In a process for preparing a catalyst comprising a Group VI-B or Group VIII metal, or both, composited with alumina, the alumina being precipitated as an alumina hydrogel from a solution which contains a hydrous form of alumina and a compound having an anion soluble in an alkaline medium and which forms a soluble aluminum salt,

the improvement comprising

precipitating the hydrogel of alumina at temperatures ranging from about 15° F to about 120° F from the solution, which contains alumina in concentration ranging from about 1 to about 5 percent, based on the weight of solution, at pH ranging from about 8 to about 12,

separating the alumina hydrogel from the solution,

contacting the alumina hydrogel with a solution of a water-soluble polymer containing from about 2 to about 24 monomer units from the group consisting of (a) polyethylene glycols, (b) polypropylene glycols, and (c) polyethylene amines sufficient to absorb the polymer into the pores of the alumina hydrogel, displacing water from the pores until the weight ratio of polymer:alumina within the hydrogel ranges from about 0.5:1 to about 4:1,

drying the hydrogel, and then

calcining the dried hydrogel to form a gamma alumina catalyst composite characterized, when the catalyst is of size ranging from about 1/50 inch up to 1/25 inch average particle size diameter, at least about 15 percent of its total pore volume of absolute diameter within the range of about 150A to about 250A; when the catalyst is of size ranging from about 1/25 inch to about ⅛ inch average particle size diameter, at least about 15 percent of its total pore volume of absolute diameter within the range of about 175A to about 275A; wherein, in each of these catalysts of differing ranges of particle size distributions, the pore volumes resultant from pores of 50A, and smaller, are minimized; the surface areas and pore volumes of the catalysts being interrelated with particle size, and pore size distributions, surface areas ranging at least about 200 m^2/g to about 600 m^2/g with pore volumes ranging from about 0.8 to about 3.0 cc/g (B.E.T.).

4,016,109

ALICYCLIC KETOESTER PERFUME COMPOSITIONS

Amnon Mordechai Cohen, Amersfoort, Netherlands, assignor to Polak's Frutal Works N.V., Amersfoort, Netherlands

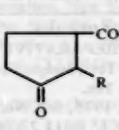
Division of Ser. No. 418,868, Nov. 26, 1973, Pat. No. 3,954,834, which is a continuation of Ser. No. 195,476, Nov. 3, 1971, abandoned. This application Apr. 27, 1976, Ser. No. 680,660

Claims priority, application United Kingdom, Nov. 4, 1970, 52388/70

Int. Cl.² C11B *9/00*

U.S. Cl. 252—522 **11 Claims**

1. A perfume composition containing as an active ingredient thereof an effective amount of a chemical compound having the structural formula



where R is a branched or straight chain alkyl radical having 4 to 8 carbon atoms, a cyclopentyl radical or a cyclohexyl radi-

cal and R′ represents an alkyl radical having 1 or 2 carbon atoms and an inert diluent or carrier.

4,016,110

PROCESS FOR THE PREPARATION OF EXPANDABLE MICROSPHERES

William E. Cohrs, Midland; Roland E. Gunderman, Clare, and William A. Crozier, Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed July 26, 1972, Ser. No. 275,268

Int. Cl.² C08J 9/20

U.S. Cl. 260—2.5 B **4 Claims**

1. In a method for the preparation of expandable synthetic resinous microspheres, the method comprising

suspending in water a colloidal silica dispersing agent, a polymerizable monomeric composition, a volatile liquid expanding agent,

dispersing the volatile liquid expanding agent and monomeric composition within the water as a plurality of droplets,

polymerizing the monomeric material to form a plurality of particles, the particles having a thermoplastic resinous shell of generally spherical configuration, the particles generally symmetrically encapsulating a single liquid occlusion as a distinct and separate liquid phase within the particle, the particles being generally impenetrable to the liquid raising agent, the improvement which comprises

employing from about 0.2 to about 1 part by weight of citric acid per 100 parts by weight of monomeric composition in the substantial absence of a polymer of equimolar parts of adipic acid and diethanol amine.

4,016,111

NON-BURNING, CLASS 1 RATING, FOAMS AND A METHOD OF PRODUCING SAME

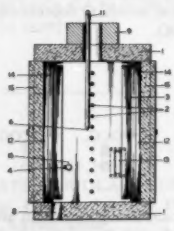
Per Lind Wolff, Birkeroed, Denmark, and John Arthur Gooch Gent, Liphook, England, assignors to Koninklijke Emballage Industrie Van Leer B.V., Amstelveen, Netherlands

Filed Apr. 1, 1975, Ser. No. 564,184

Claims priority, application United Kingdom, Apr. 4, 1974, 15067/74

Int. Cl.² C08J 9/00

U.S. Cl. 260—2.5 F **9 Claims**



1. A method of preparing foamed solid aminoformaldehyde furfurylalcohol products by polymerizing a liquid furfurylalcohol containing aminoformaldehyde resin composition in the presence of an acid, characterized in using as a starting material a resin composition containing 15–90% by weight of total free and bound furfurylalcohol and having an urea: formaldehyde molar ratio of 1:1 to 1:5 and at least 10 parts by weight of a boron compound per 100 parts by weight of said resin, the boron compound being present in an amount sufficient so that the foam product will pass the muffle furnace test at 500° C., and has no second exotherm at 200° C., said boron compound being selected from the group consisting of boric acid, boron oxide, borax, boric acid esters, boron tribromide, boron trichloride, boron nitride, boron phosphate, boron trifluoride etherate, boron trifluoride methanol, boron trifluoride monoethylamine, complexes of boric acid with polyhydroxyl compounds, and mixtures thereof.

4,016,112

PROCESS FOR PRODUCTION OF FOAMED RESIN STRUCTURE

Atsusuke Kajiura; Yuzo Aito, both of Hino; Atsushi Sugiyama; Hiroki Tamura, both of Hachioji, and Kazuma Aihara, Hino, all of Japan, assignors to Teijin Limited, Osaka, Japan

Continuation of Ser. No. 326,064, Jan. 23, 1973, abandoned. This application Feb. 14, 1975, Ser. No. 549,975

Int. Cl.² C08J 9/08

U.S. Cl. 260—2.5 N **23 Claims**

1. A process for the production of a cured foamed structure characterized by:

I. mixing to a uniformly dispersed state

A. at least one member of the group consisting of metal carbonates and metal bicarbonates,

B. at least one member of the group consisting of phosphoric acid esters and phosphorous acid esters, and

C. a curable resin composition selected from at least one member of the group consisting of an unsaturated polyester resin composition, a diallyl phthalate resin composition, and a 1,2-butadiene-containing polymer composition; and then

II. heating the mixture at a temperature of from 80° to 160° C. to form a foam, cured three-dimensionally by double bonds, with the proviso that where R and R′ are butyl, the temperature may be as low as 20° C.

4,016,113

USE OF SCHIFF BASES AS CROSS-LINKING AGENTS FOR HIGH RESILIENCE POLYURETHANE FOAM

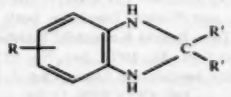
Frank J. Preston, Meriden; John S. Babiec, Jr., Orange, and Clifford J. Maxwell, Milford, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Feb. 17, 1976, Ser. No. 658,234

Int. Cl.² C08G 18/14

U.S. Cl. 260—2.5 AM **17 Claims**

1. In a process for preparing a flexible high resilience polyurethane foam from a reaction mixture comprised of an organic polyisocyanate, a foaming agent, a reaction catalyst, and a polyether polyol reactant characterized by (1) a molecular weight of at least about 4,000, (2) a polyhydroxy alcohol nucleus having a functionality of 2–4, (3) polyoxyalkylene chain segments attached to said nucleus and (4) a ratio of primary to secondary hydroxy groups ranging from about 1.5:1 to about 6:1, the improvement which comprises including in said reaction mixture a crosslinking amount of a Schiff base represented by the formula:



wherein

R is a hydrogen or alkyl or 1–12 carbon atoms, and

each R′ is independently an aliphatic hydrocarbon radical having 1–12 carbon atoms, or the moiety

is an unsubstituted or alkyl-substituted cycloaliphatic radical having 5 or 6 ring carbon atoms, the alkyl substitutent having 1–6 carbon atoms.

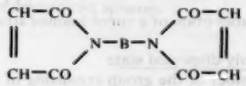
4,016,114
HEAT-STABLE CELLULAR MATERIALS

Max Gruffaz, La Mulatiere, and Bernard Rollet, Lyon, both of France, assignors to Rhone-Poulenc Industries, Paris, France

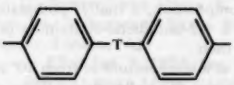
Filed June 14, 1976, Ser. No. 695,403
Claims priority, application France, June 30, 1975, 75.20455
Int. Cl.² L08J 9/10
U.S. Cl. 260—2.5 N **8 Claims**

1. A cellular material based on a polymer with imide groups, characterized in that it is obtained by heating a mixture comprising:

a. a bis-maleimide of the formula


(I)

in which the symbol B represents a phenylene radical or a radical of the formula

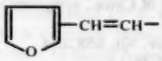


where T represents $-CH_2-$, $-O-$ or $-SO_2-$;

b. a furfuraldehyde derivative of the formula

(II)

in which the symbol Σ represents a radical of the formula



and the symbols R_1 represent the valency bond or a $-CH=CH-$ group, and the symbol Σ′ represents a radical Σ, an aliphatic, cycloaliphatic or aromatic monovalent radical R containing up to 12 carbon atoms, or a $-R'-CO'R''$ radical, where R′ represents an aliphatic, cycloaliphatic or aromatic divalent radical containing up to 12 carbon atoms and R″ represents a monovalent radical R or a radical Σ; and

c. a blowing agent.

4,016,115
UNSATURATED POLYESTER RESIN COMPOSITION CONTAINING TITANIUM DIOXIDE

Hideo Miyake, and Toshio Tsuchida, both of Otsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Sept. 26, 1975, Ser. No. 617,172
Claims priority, application Japan, Oct. 2, 1974, 49-114048
Int. Cl.² C08K 11/04
U.S. Cl. 260—2.3 **15 Claims**

1. An unsaturated polyester resin composition containing titanium dioxide comprising:

1. an unsaturated polyester resin containing titanium dioxide consisting of
   i. an unsaturated polyester containing titanium dioxide obtained from
      a. a depolycondensation product produced by depolycondensing a high molecular weight saturated polyester containing titanium dioxide by using one or more compounds selected from the group consisting of glycols, saturated dibasic acids or anhydrides thereof, unsaturated dibasic acids or anhydrides thereof, and esters or oligoesters thereof, and
      b. other raw materials required for the formation of an unsaturated polyester and
   ii. a copolymerizable monomer and
2. at least one compound selected from the group consisting of

A. a hydroxyalkylamine having at least one amino group and at least one hydroxyl group attached to different carbon atoms thereof,

B. a polyoxyalkyleneamine,

C. a mono- or dicarboxylate derived from the said compound (A) and

D. a mono- or dicarboxylate derived from the said compound (B),

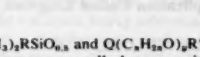
wherein the amount of addition of the said compound (2) is in the range of from 0.01 to 1% by weight on the basis of the said unsaturated polyester resin.

4,016,116
PROCESS FOR THE PREPARATION OF POLYVINYL CHLORIDE FOAMS

Guy Poy, Lyon, France, assignor to Rhone-Poulenc S.A., Paris, France

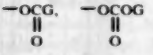
Division of Ser. No. 493,458, July 31, 1974, Pat. No. 3,975,361. This application Mar. 23, 1976, Ser. No. 669,732
Claims priority, application France, Aug. 1, 1973, 73.28211
Int. Cl.² C08J 9/30
U.S. Cl. 260—2.5 P **9 Claims**

1. A process for the preparation of an open-cell polyvinyl chloride foam by introducing a gaseous fluid into a polyvinyl chloride plastisol which contains 0.5 to 10% of its weight of an organosilicon copolymer comprising units of the general formulae:

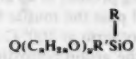


$(CH_3)_3RSiO_{0.5}$ and $Q(C_nH_{2n}O)_yR'SiO$ and SiO_2,

wherein R represents an alkyl group with 1 to 3 carbon atoms or a vinyl group, R′ represents a divalent hydrocarbon radical with 1 to 10 carbon atoms, Q represents an organic radical of the formulae —OG,



or $-OSiR_3$ in which G represents an alkyl radical with 1 to 4 carbon atoms and each R group, which may be identical or different, is as defined above, *n* represents 2, 3 or 4, the C_nH_{2n} group being straight or branched and y represents a number from 4 to 60; the C_nH_{2n} groups being the same or different, the ratio of the number of $(CH_3)_3RSiO_{0.5}$ units to the number of SiO_2 units being 0.55:1 to 0.75:1 and the ratio of the number of



units to the number of SiO_2 units being 0.005:1 to 0.1:1.

4,016,117

BIODEGRADABLE SYNTHETIC RESIN SHEET MATERIAL CONTAINING STARCH AND A FATTY MATERIAL

Gerald Joseph Louis Griffin, London, England, assignor to Coloroll Limited, London, England

Continuation-in-part of Ser. No. 353,414, April 23, 1973, abandoned. This application Nov. 25, 1974, Ser. No. 527,038

Claims priority, application United Kingdom, May 18, 1972, 23469/72; Nov. 28, 1973, 55195/73; Mar. 7, 1974, 10267/74

Int. Cl.² C08J *3/20*

U.S. Cl. 260—17.4 ST 6 Claims

1. A biodegradable synthetic polymeric composition consisting essentially of a polymer having carbon to carbon linkages and dispersed therein from 5 to 50% by weight particles of a biodegradable substance and up to 5.5% by weight of an auto-oxidizable substance containing at least one double bond which when in contact with a transition metal salt auto-oxidizes to generate a peroxide or a hydroperoxide, said substance being selected from the group consisting of a fatty acid, a fatty acid ester, a natural fat, and mixtures thereof, whereby said polymeric composition when disposed in soil containing a transition metal salt will be biodegraded at a rate faster than a similar product free from said substance.

4,016,118

POLYOLEFIN PLASTIC COMPOSITIONS

Kenzo Hamada, and Hiroshi Uchiyama, both of Hirakata, Japan, assignors to E. C. Chemical Industries & Co., Ltd. and C. Itoh & Co., Ltd., both of Osaka, Japan

Filed Aug. 12, 1975, Ser. No. 604,045

Claims priority, application Japan, Aug. 16, 1974, 49-94424

Int. Cl.² C08L *5/00*

U.S. Cl. 260—17.4 SG 4 Claims

1. A polyolefin plastic composition having improved transparency and reduced molding shrinkage, which consists essentially of at least one homopolymer or copolymer of an aliphatic monoolefin containing 2 to 6 carbon atoms which has an average molecular weight of about 10,000 to 200,000, said copolymer made by polymerizing said monoolefins with one another and dibenzylidene sorbitol, the proportion of the dibenzylidene sorbitol being 0.1 to 0.7% by weight based on the total weight of the composition.

4,016,119

LIGNIN SULFONATE FOR GLASS CORD ADHESIVES

Otto C. Elmer, Akron, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Filed Jan. 22, 1975, Ser. No. 542,974

Int. Cl.² C08L *9/08, 61/12, 97/00*

U.S. Cl. 260—17.5 3 Claims

1. A composition comprising an aqueous alkaline dispersion of from 15 to 45% by weight based upon the weight of the dispersion of a mixture of solids consisting of from 7 to 40% by weight based upon the weight of the dispersion of a rubbery vinyl pryidine terpolymer containing based upon the weight of the terpolymer from about 50 to 95% of a conjugated diolefin, about 0 to 30% of styrene and about 5 to 40% of a vinyl pyridine, and from about 0.5 to 10% by weight based upon the weight of the dispersion of a reaction product of lignin sulfonate, resorcinol and formaldehyde wherein the reaction product contains based upon the weight of the reaction product 22 to 42% of lignin sulfonate, from 27 to 47% of resorcinol and from 21 to 41% of formaldehyde.

4,016,120

AQUEOUS CATIONIC POLYURETHANE HAVING BLOCKED NCO GROUPS AND PROCESS

Kazuo Matsuda; Hidemasa Ohmura, and Takeyo Sakai, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed July 12, 1976, Ser. No. 704,612

Claims priority, application Japan, July 28, 1975, 50-91805

Int. Cl.² C08G *18/80;* C08J *3/06*

U.S. Cl. 260—29.2 TN 8 Claims

1. A process for preparing an aqueous cationic thermosetting polyurethane emulsion, which comprises:

1. reacting, in the liquid phase and in a ketone solvent, at a temperature of from −20° to +70° C, (A) isocyanate-terminated urethane prepolymer prepared by reacting organic polyhydroxyl component having a molecular weight in the range of from 200 to 10000 with an excess of organic polyisocyanate, with (B) an excess of polyalkylene polyamine having at least two primary or secondary amino groups, the total mole number of primary and secondary amino groups in the polyalkylene polyamine being greater than the total mole number of isocyanate groups in the isocyanate-terminated urethane prepolymer, the reaction being carried out until the presence of —NCO groups cannot be detected, whereby to form polyurethane-urea-polyamine,
2. reacting, in the liquid phase, the reaction product of step 1 with a blocked polyisocyanate having a single free isocyanate group in the molecule, at a temperature of −20° to +70° C for about 0.5 to 2 hours,
3. adding to the reaction product of step 2 an aqueous solution of an acid to form an emulsion having a pH of about 5 to about 7, and
4. treating the product of step 3 to remove the organic solvent therefrom and thereby obtaining an aqueous cationic polyurethane emulsion as a final product.

4,016,121

AQUEOUS POLYURETHANE HAVING BLOCKED NCO GROUPS AND PROCESS

Kazuo Matsuda; Hidemasa Ohmura, and Takeyo Sakai, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed July 12, 1976, Ser. No. 704,614

Claims priority, application Japan, July 22, 1975, 50-89447

Int. Cl.² C08G *18/80;* C08J *3/06*

U.S. Cl. 260—29.2 TN 8 Claims

1. A process for preparing an aqueous thermosetting polyurethane emulsion, which comprises:

1. reacting, the liquid phase and in a ketone solvent, at a temperature of from −20° to +70° C., (A) isocyanate-terminated urethane prepolymer prepared by reacting organic polyhydroxyl component having a molecular weight in the range of from 200 to 10,000 with an excess of organic polyisocyanate, said polyhydroxyl component comprising from 15 to 80 weight % of polyoxyethylene glycol, with (B) an excess of polyalkylene polyamine having at least two primary or secondary amino groups, the total mole number of primary and secondary amino groups in the polyalkylene polyamine being greater than the total mole number of isocyanate groups in the isocyanate-terminated urethane, prepolymer, the reaction being carried out until the presence of —NCO groups cannot be detected, whereby to form polyurethane-urea-polyamine,
2. reacting, in the liquid phase, the reaction product of step 1 with a blocked polyisocyanate having a single free isocyanate group in the molecule, at a temperature of −20° to +70° C., for about 0.5 to 2 hours,
3. adding water to the reaction product of step 2, and
4. treating the product of step 3 to remove the organic solvent therefrom and thereby obtaining an aqueous polyurethane emulsion as a final product.

4,016,122
ANIONIC AQUEOUS POLYURETHANE HAVING BLOCKED NCO GROUPS AND PROCESS

Kazuo Matsuda; Hidemasa Ohmura, and Takeyo Sakai, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed July 14, 1976, Ser. No. 705,266
Claims priority, application Japan, July 31, 1975, 50-93326
Int. Cl.² C08G *18/80*; C08J *3/06*
U.S. Cl. 260—29.2 TN **8 Claims**

1. A process for preparing an aqueous anionic thermosetting polyurethane emulsion, which comprises:

1. reacting, in the liquid phase and in a ketone solvent, at a temperature of from −20° C to +70° C, (A) isocyanate-terminated urethane prepolymer prepared by reacting organic polyhydroxyl component having a molecular weight in the range of from 200 to 10,000 with an excess of organic polyisocyanate, with (B) an excess of polyalkylene polyamine having at least two primary or secondary amino groups, the total mole number of primary and secondary amino groups in the polyalkylene polyamine being greater than the total mole number of isocyanate groups in the isocyanate-terminated urethane prepolymer, the reaction being carried out until the presence of —NCO groups cannot be detected, whereby to form polyurethane-urea-polyamine,
2. reacting, in the liquid phase, the reaction product of step 1 with a blocked polyisocyanate having a single free isocyanate group in the molecule, at a temperature of −20° C to +70° C, for about 0.5 to 2 hours,
3. reacting the product of step 2, in the liquid phase, at a temperature of from 5° to 70° C, for from about 0.5 to 2 hours, with a cyclic dicarboxylic acid anhydride,
4. adding to the reaction product of step 3, an aqueous solution of a base to adjust the pH of the product of step 3 to be in the range of about 6 to about 9, and
5. treating the product of step 4 to remove the organic solvent therefrom and thereby obtaining an aqueous anionic polurethane emulsion as a final product.

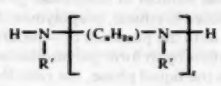
4,016,123
PROCESS FOR PREPARATION OF CATIONIC RESIN AQUEOUS EMULSIONS

Kazuo Matsuda; Hidemasa Ohmura, both of Wakayama, and Yukihisa Niimi, Osaka, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed July 11, 1975, Ser. No. 595,018
Claims priority, application Japan, July 18, 1974, 49-82618
Int. Cl.² C08J *3/06*; C08L *75/02*, *75/12*
U.S. Cl. 260—29.2 TN **7 Claims**

1. A process for preparing a cationic polyurethane aqueous emulsion, which comprises:

1. reacting, in the liquid phase and in a ketone solvent, at a temperature of from −20° to +70° C, (A) isocyanate-terminated urethane prepolymer prepared by reacting organic polyol having a molecular weight in the range of from 200 to 10,000 with an excess of organic polyisocyanate, with (B) an excess of polyalkylene polyamine having at least two primary or secondary amino groups, said polyalkylene polyamine having the formula



wherein n is an integer larger than one, z is an integer from 2 to 4 and R′ is hydrogen, alkyl having one to 4 carbon atoms or hydroxyalkyl having one to 4 carbon atoms, the ratio of (b) the total mole number of primary and secondary amino groups containing active hydrogen atoms in the polyalkylene polyamine to (a) the total mole number of isocyanate groups in the isocyanate-terminated urethane prepolymer being within the range of $1 < b/a \leqq 5$, the reaction being carried out until the presence of —NCO groups cannot be detected, whereby to form polyurethane-urea-polyamine,
2. reacting with the polyurethane-urea-polyamine of step 1, a substance selected from the group consisting of alkyl isocyanates having an alkyl group containing 12 to 22 carbon atoms, acyl chlorides having an alkyl group containing 12 to 22 carbon atoms and α-olefin epoxides having from 12 to 22 carbon atoms, to form an alkyl-substituted polyurethane-urea-polyamine, the amount of said substance being from 10 to 80 mole %, based on the number of moles of amino groups in the molecule of said polyurethane-urea-polyamine,
3. adding to the reaction product of step 2 an aqueous solution of an acid to form an emulsion, the amount of said acid being an amount such that the pH of polyurethane-urea-polyamine emulsion is within the range of about 5 to about 7, and
4. treating the product of step 3 to remove the organic solvent therefrom and thereby obtaining an aqueous cationic polyurethane emulsion as a final product.

4,016,124
CEMENTS COMPRISING ACRYLIC ACID/ITACONIC ACID COPOLYMER AND FLUOROALUMINOSILICATE GLASS POWDER

Stephen Crisp, Hounslow, and Alan Donald Wilson, Liphook, both of England, assignors to National Research Development Corporation, England

Filed Aug. 15, 1974, Ser. No. 497,686
Claims priority, application United Kingdom, Aug. 21, 1973, 39383/73
Int. Cl.² C08K *3/40*
U.S. Cl. 260—29.6 M **17 Claims**

1. A poly(carboxylate) cement pack comprising as one component a water-soluble copolymer of acrylic acid and itaconic acid, the mole ratio of acrylic acid to itaconic acid in the copolymer being from 19:1 to 2:1, the copolymer having an average molecular weight of from 5,000 to 19,000 and as another component a fluoroaluminosilicate glass powder which will react with the acrylic acid-itaconic acid copolymer in the presence of water to give a plastic mass which hardens to form a poly(carboxylate) cement.

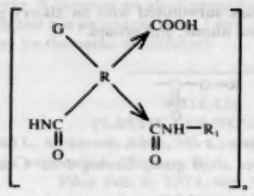
4,016,125
FLUOROPOLYMER COATING COMPOSITIONS HAVING IMPROVED ADHESION

Eustathios Vassiliou, Newark, Del., and Thomas P. Concannon, Newtown Square, Pa., assignors to E. I. Du Pont de Nemours and Co., Wilmington, Del.

Filed July 21, 1975, Ser. No. 597,493
Int. Cl.² C08L *27/18*
U.S. Cl. 260—29.6 F **10 Claims**

1. A coating composition comprising

a. about 10–90%, by weight of the total of (a) and (b) solids, of a polymer of monoethylenically unsaturated hydrocarbon monomers completely substituted with fluorine atoms or a combination of fluorine atoms and chlorine atoms, having a number average molecular weight of at least 20,000;
b. about 10–90%, by weight of the total of (a) and (b) solids, of a binder which comprises
   1. about 5–95%, by weight of the total of (1) and (2) solids, of an alkali metal silicate having an alkali metal oxide mol content within the range of from a trace amount to about 20% of the total number of mols of alkali metal oxide and silicon dioxide, and
   2. about 5–95%, by weight of the total of (1) and (2) solids, of a salt of a polyamide acid represented by the structure



4,016,126

LAMINATED STRUCTURES AND METHODS AND COMPOSITIONS FOR PRODUCING SAME

Giancarlo J. Fumei, Lake Grove, and James A. Karabedian, Garden City, both of N.Y., assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 573,924, May 2, 1975, abandoned, which is a continuation of Ser. No. 275,951, July 28, 1972, abandoned. This application July 31, 1975, Ser. No. 600,615

Int. Cl.² C08L *31/04*

U.S. Cl. 260—29.6 RB 9 Claims

1. A multi-phase adhesive composition especially adapted to bond two dissimilar materials one of which is polymeric material and the other of which is a porous hydrophilic material comprising a continuous phase of water, a major dispersed phase of a copolymer of ethylene and a terminally ethylenically unsaturated organic compound containing three to five carbon atoms, and a second minor dispersed phase comprising a solute polymer of the same chemical kind as the polymeric material to be bonded but having an average molecular weight of from about 4 to 100 percent of the average molecular weight of said polymeric material to be bonded, and said solute polymer being dissolved in a solvent for said polymer.

4,016,127

EMULSION COPOLYMERS OF ACROLEIN AND THEIR USE IN TREATING LEATHER

Bjorn E. Larsson, Rushland, and Stanley Le Sota, Horsham, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 350,573, April 12, 1973, Pat. No. 3,896,085, and a continuation-in-part of Ser. No. 160,178, July 6, 1971, abandoned. This application Jan. 31, 1975, Ser. No. 546,064

Int. Cl.² C08F *216/34, 16/34, 20/02*

U.S. Cl. 260—29.6 TA 8 Claims

1. An aqueous dispersion of an emulsion copolymer of

a. from about 0.25 to 4 by weight of acrolein;

b. from about 0.5 to about 10% by weight of an α,β-ethylenically unsaturated carboxylic acid or a mixture of α,β-ethylenically unsaturated carboxylic acids;

c. from 0 to about 99.25% by weight of a alkyl (C_1–C_{24}) ester of methacrylic acid or a mixture of alkyl (C_1–C_{24}) esters of methacrylic acid; and

d. up to about 99.25% by weight of a alkyl (C_1–C_8) ester of acrylic acid or a mixture of alkyl (C_1–C_8) esters of acrylic acid, the sum of (a+b+c+d) always being 100 parts by weight.

4,016,128

PREPARATION OF AQUEOUS SOLUTIONS OF QUATERNARY AMMONIUM RESINS FROM DI(TERTIARY AMINE) AND 1,4-DIHALOBUTENE-2

Irving Serlin, Springfield, and Albert H. Markhart, Wilbraham, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed May 23, 1975, Ser. No. 580,508

Int. Cl.² C08L *79/00, 87/00*

U.S. Cl. 260—29.6 HN 8 Claims

1. A process for preparing an aqueous solution of a quaternary ammonium resin which comprises:

A. reacting a di(tertiary amine) with from 1 to 10 mol percent excess of a 1,4-dihalobutene-2 containing from 0.5 to 5 weight percent of a 3,4-dihalobutene-1, in aqueous medium to provide a resin content in the range of 65 to 90 weight percent,

B. steam distilling until the condensate is clear and colorless, and

C. adding a stabilizing amount of a buffer solution to maintain the pH of the resin solution in the range of 6.5 to 7.5.

4,016,129

HARDENABLE COATING COMPOSITION

Yoshiaki Miyosawa, Hiratsuka, Japan, assignor to Kansai Paint Company, Ltd., Amagasaki, Japan

Filed July 29, 1975, Ser. No. 600,092

Claims priority, application Japan, July 30, 1974, 49-4986590; July 30, 1974, 49-4986591; July 30, 1974, 49-4986592

Int. Cl.² C08L *43/04*

U.S. Cl. 260—29.6 B 12 Claims

1. A hardenable coating composition which comprises an aqueous dispersion of silica-polyvinyl alcohol complex obtainable by the reaction between a dispersion of colloidal silica and a solution of polyvinyl alcohol at a temperature above 50° C.

4,016,130

PRODUCTION OF SOLID, RIGID FILLED POLYURETHANE COMPOSITES

Thaddeus Antczak, 32431 Halmich Drive, Warren, Mich. 48092

Filed May 15, 1975, Ser. No. 576,371

Int. Cl.² C08K *9/00*

U.S. Cl. 260—37 N 7 Claims

1. A process for the production of solid, rigid filled polyurethane composites which comprises

a. preparing and maintaining separately an isocyanate component and a polyol each of which has been dried and is bubble-free,

b. adding with stirring to said isocyanate component a degreased, dust- and solid-impurity-free filler dried to a constant weight at a temperature over 100° C. and maintained under vacuum,

c. admixing the filler-isocyanate component obtained from step (b), above, with said polyol,

d. degassing under vacuum the admixture obtained in step (c), above, until no gas evolution occurs, and

e. pouring the degassed admixture obtained in step (d), above, into a suitable dry mold at atmospheric pressure to effect reaction between the isocyanate and polyol.

4,016,131
PREPARATION OF UNSATURATED POLYESTER COMPOSITIONS

Thomas Clifford Shutt, Arvada, and L. Wayne Snider, Denver, both of Colo., assignors to Vitrofil Corporation, Denver, Colo.

Filed Apr. 4, 1975, Ser. No. 565,238
Int. Cl.² C08K *3/40*
U.S. Cl. 260—40 R **18 Claims**

1. Composition for fiber-glass reinforced plastic products comprising an admixture of unsaturated polyester and substantially pre-cleaned, dry and moisture-protected, fractured, active, finely ground powder particles of soda-containing silicate glass having a high and irregular surface area, an average particle size below about 40 mesh and an active cured polyester structurally reinforcing property.

4,016,132
COLORATION OF POLYOLEFINE ARTICLES

Gerard Lees, Harrogate, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation-in-part of Ser. No. 403,852, Oct. 5, 1973, abandoned. This application Nov. 17, 1975, Ser. No. 632,661
Claims priority, application United Kingdom, Oct. 9, 1972, 46406/72
Int. Cl.² C08K *9/10*
U.S. Cl. 260—40 R **16 Claims**

1. A coloured shaped article of a polymer of an unsaturated hydrocarbon or an unsaturated halogenated hydrocarbon containing from 5 to 20% of a polyester by weight of said hydrocarbon polymer as a multiplicity of small particles or fibrils distributed throughout the article, wherein colouring matter in an amount of from 0.01 to 2% by weight of said olefine polymer is present and is soluble in the polyester and is carried substantially wholly within and throughout only the polyester particles or filbrils and the weight ratio of colouring matter to polyester is at least 1:20.

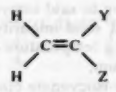
4,016,133
FLUORESCENT COLORED RESIN PARTICLES AND PROCESS FOR PREPARATION THEREOF

Yoshihiko Hyosu; Eiiti Miyashita; Noboru Kuzuba, all of Kamakura; Sadayasu Miyahara, Fujisawa, and Ryoshiro Takano, Kamakura, all of Japan, assignors to Sinloihi Co., Kamakura, Japan

Continuation of Ser. No. 452,375, March 18, 1974, abandoned, which is a continuation of Ser. No. 207,797, Dec. 14, 1971, abandoned. This application Sept. 3, 1975, Ser. No. 610,078
Int. Cl.² C08K *5/00*
U.S. Cl. 260—42.21 **3 Claims**

1. A process for the preparation of fluorescent colored resin particles which comprises copolymerizing in an aqueous medium in the presence of a water-soluble fluorescent dye which is at least one member selected from the group consisting of xanthenes, acridines, thiazoles and benzimidazoles, a mixture of monomers comprising

A. a polymerizable unsaturated monomer having a low affinity for said dye, which is selected from compounds having the formula

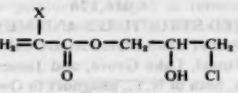


wherein Z is a member selected from the group consisting of hydrogen atom and lower alkyl groups having 1 to 4 carbon atoms and Y is a member selected from the group consisting of acetoxy and phenyl groups, phenyl groups substituted with a lower alkyl group having 1 to 2 carbon atoms, phenyl groups substituted with an alkoxy group having 1 to 2 carbon atoms, and groups

in which R is a lower alkyl group having 1 to 4 carbon atoms,

B. a polymerizable unsaturated monomer having at least one cyano group, which is selected from the group consisting of acrylonitrile and methacrylonitrile, and

C. at least one water-insoluble or barely water-soluble polymerizable unsaturated monomer containing a group having a high affinity for said dye, said monomer being selected from the group consisting of compounds having the formula



wherein X is a hydrogen atom or a methyl group,

whereby said fluorescent dye is uniformly dispersed in the resin particles.

4,016,134
NOVEL COMPOSITE COMPRISING A SPECIAL GRAFT-COPOLYMER

Sueo Machi, Takasaki; Taiji Aono, Ichihara; Yasushi Matui, Satte; Yoshiharu Hibi, and Takayuki Shinano, both of Yokohama, all of Japan, assignors to Japan Atomic Energy Research Institute, Tokyo; Maruzen Oil Co., Ltd., Osaka and Mitsuhashi Kakoki Kaisha Ltd., Tokyo, all of, Japan

Continuation of Ser. No. 375,880, July 2, 1973, abandoned. This application Jan. 8, 1975, Ser. No. 539,589
Claims priority, application Japan, July 3, 1972, 47-66437; Sept. 5, 1972, 47-88337
Int. Cl.² C08K *3/30*
U.S. Cl. 260—42.24 **4 Claims**

1. A composite consisting essentially of (1) from about 10 to about 50 parts by weight of a graft-copolymer prepared by graft-copolymerizing acrylic acid monomer on polyolefin and (2) from about 90 to 50 parts by weight of gypsum and/or calcium sulfite, the percent graft in said graft-copolymer being in the range of from about 0.05 to about 10% based on the total weight of the graft-polymer.

4,016,135
RADIOACTIVE RAY-RESISTANT STABILIZER

Masaaki Takahashi; Akira Ito, both of Tokyo; Shichiro Kawawata, and Jiro Ogura, both of Hitachi, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 27, 1974, Ser. No. 536,986
Claims priority, application Japan, Dec. 27, 1973, 49-3642; Dec. 27, 1973, 49-3643
The portion of the term of this patent subsequent to June 29, 1993, has been disclaimed.
Int. Cl.² C08K *5/01*
U.S. Cl. 260—45.7 R **7 Claims**

1. A composition consisting essentially of a polymeric resin and, as a stabilizer against radioactivity, an alkyl-substituted condensed tetracyclic compound of the generic formula:

wherein, R denotes an alkyl group having one to four carbon atoms and x is an integer from 1 to 4, and when x is 2 or more, R may be the same or different.

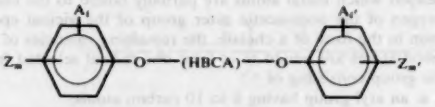
4,016,136

PLASTIC COMPOSITIONS

Arnold L. Anderson, Alma, Mich., assignor to Michigan Chemical Corporation, Chicago, Ill.

Filed Feb. 8, 1973, Ser. No. 330,808
Int. Cl.² C08L 23/00
U.S. Cl. 260—45.9 R 12 Claims

1. A plastic composition containing polyolefin having incorporated therein an effective amount of a flame retardant which is a compound having the formula:



wherein Z is selected from the group consisting of bromine or chlorine; m and m' are integers having a value of 1–4; i and i' are integers having a value of 1–2; HBCA is a halo-branched chain alkylene group having from 1 to 6 carbon atoms; and A is selected from the group consisting of cyano, nitro, lower alkoxy, lower alkyl, fluorine, dialkylamino, phenyl, halo-phenyl, benzyl and halo-benzyl, with the proviso that neither $m + i$ nor $m' + i'$ is greater than 5.

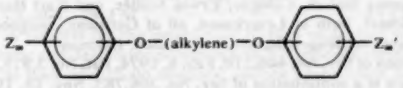
4,016,137

PLASTIC COMPOSITIONS

Arnold L. Anderson, and Robert J. Nulph, both of Alma, Mich., assignors to Michigan Chemical Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 260,240, June 6, 1972, abandoned. This application Feb. 8, 1973, Ser. No. 330,763
Int. Cl.² C08L 25/10
U.S. Cl. 260—45.75 R 15 Claims

1. A plastic composition comprising acrylonitrile-butadiene-styrene polymer and a flame retardant, said flame retardant consisting of a compound having the formula



wherein (a) Z is bromine; (b) m and m' are independent and are integers having a value of from 1 to 5; and (c) alkylene is a straight or branched chain alkylene group having from one to six carbon atoms.

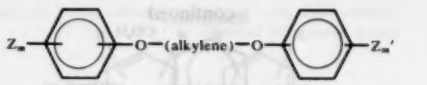
4,016,138

PLASTIC COMPOSITIONS

Arnold L. Anderson, Alma, Mich., assignor to Michigan Chemical Corporation, Chicago, Ill.

Continuation of Ser. No. 330,823, Feb. 8, 1973, abandoned, which is a continuation-in-part of Ser. No. 260,240, June 6, 1972, abandoned. This application Aug. 22, 1974, Ser. No. 499,727
The portion of the term of this patent subsequent to Apr. 5, 1994, has been disclaimed.
Int. Cl.² C08L 71/04
U.S. Cl. 260—45.75 R 15 Claims

1. A plastic composition comprising a poly(phenylene oxide) and a flame retardant, said flame retardant consisting of a bis-phenoxy compound having the formula



wherein (a) Z is bromine; (b) m and m' are independent and are integers having a value of from 1 to 5; and (c) alkylene is a straight or branched chain alkylene group having from 1 to 6 carbon atoms.

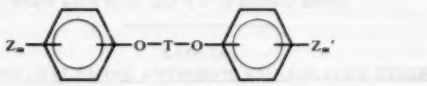
4,016,139

PLASTIC COMPOSITION COMPRISING ACRYLONITRILE-BUTADIENE-STYRENE POLYMER, A BIS-PHENOXY FLAME RETARDANT AND A FLAME RETARDANT ENHANCING AGENT

Arnold L. Anderson, and Robert J. Nulph, both of Alma, Mich., assignors to Michigan Chemical Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 330,763, Feb. 8, 1973, which is a continuation-in-part of Ser. No. 260,240, June 6, 1972, abandoned. This application June 16, 1975, Ser. No. 586,945
The portion of the term of this patent subsequent to Dec. 25, 1987, has been disclaimed.
Int. Cl.² C08L 25/10
U.S. Cl. 260—45.75 R 29 Claims

1. A plastic composition comprising a three component system consisting of (1) acrylonitrile-butadiene-styrene polymer, (2) a bis-phenoxy compound, which functions as a flame retardant for said composition, having the formula



wherein (a) Z is bromine; (b) m and m' are independent and are integers having a value of from 1 to 5 with the proviso that the bromine atom content is from 6 to 10 bromine atoms; and (c) T is a straight or branched chain carbon group having from one to four carbon atoms, and (3) a flame retardant enhancing agent.

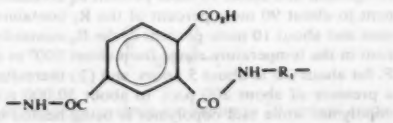
4,016,140

AMIDE-IMIDE COPOLYMER MOLDINGS AND METHOD OF PREPARATION

Edwin F. Morello, Hammond, Ind., assignor to Standard Oil Company, Chicago, Ill.

Continuation of Ser. No. 239,823, March 30, 1972, abandoned, which is a continuation of Ser. No. 79,677, Oct. 9, 1970, abandoned. This application Dec. 30, 1974, Ser. No. 537,255
Int. Cl.² C08G 73/14; B29F 5/00
U.S. Cl. 260—47 CP 18 Claims

1. A process for preparing a molded article which consists essentially of the steps: (1) heating a copolymer consisting essentially of A units having a formula selected from the group consisting of:



and

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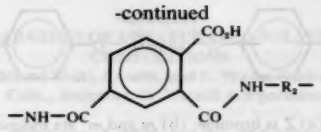
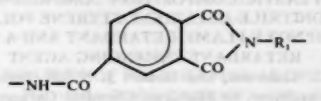
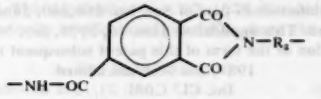


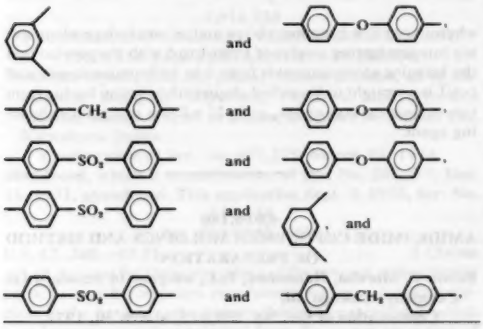
and B units having a formula selected from the group consisting of:



and



wherein R_1 and R_2 are different and are chosen from the class consisting of:



and wherein the proportions of A and B units run from about 1 mole percent A units and about 99 mole percent B units to about 99 mole percent A units and about 1 mole percent B units and wherein the R_1 and R_2 containing components of the A and B units run from about 10 mole percent R_1 containing component and about 90 mole percent R_2 containing component to about 90 mole percent of the R_1 containing component and about 10 mole percent of the R_2 containing component in the temperature range from about 300° to about 700° F. for about 0.5 to about 5 hours, and (2) thereafter applying a pressure of about 200 p.s.i. to about 30,000 p.s.i. to said copolymer while said copolymer is being heated in the temperature range from about 200° to about 750° F.

4,016,141

EPOXY RESIN CONTAINING ACETOACETIC GROUPS

Jürgen Ritz, Nierstein, and Johannes Reese, Wiesbaden-Biebrich, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

Continuation of Ser. No. 239,325, March 29, 1972, abandoned. This application June 3, 1974, Ser. No. 475,965
Claims priority, application Germany, July 30, 1971, 2338116; Dec. 24, 1971, 2164489
Int. Cl.² C08G *30/04*
U.S. Cl. 260—47 EP **11 Claims**

1. A vicinal epoxy resin containing acetoacetic groups being bound to a carbon atom of at least one opened epoxy group in which at least a part of the acetoacetic ester groups is enolized by atoms of at least one metal from groups I to VI or Ia to VIIIa of the Periodic Table according to Meyer and Mendelejeff which metal atoms are partially bound to the enolic oxygen of the acetoacetic ester group of the vicinal epoxy resin in the form of a chelate, the remaining valencies of the metal atoms are bound to at least one radical selected from the group consisting of

a. an aryl group having 6 to 10 carbon atoms,
b. an alkyl group having up to 8 carbon atoms and
c. the enolic oxygen of a monomer compound also in the form of a chelate.

4,016,142

PROCESS FOR THE CONTROL OF CARBOXYL END GROUPS IN FIBER-FORMING POLYESTERS

William Alexander, Kingston, Canada; Alfredo Guillermo Causa, Akron, Ohio, and James Girvan Fraser, Kingston, Canada, assignors to Millhaven Fibers, Ltd., Canada

Filed Nov. 9, 1966, Ser. No. 592,967
Int. Cl.² C08G *63/46*
U.S. Cl. 260—75 T **2 Claims**

1. A process for reducing the concentration of free carboxyl groups in a synthetic linear fibre-forming polyethylene terephthalate comprising reacting said polyethylene terephthalate in molten form with 1-butoxy glycidyl ether, whereby polyethylene terephthalate having a concentration of free carboxyl end groups of less than 30 equivalents per million grams of said polyethylene terephthalate is produced.

4,016,143

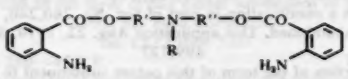
POLYURETHANES BASED ON AROMATIC POLYAMINES

Johannes Blahak, Cologne; Erwin Müller, and Karl Hartwig Richert, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 440,210, Feb. 6, 1974, Pat. No. 3,975,428, which is a continuation of Ser. No. 306,783, Nov. 15, 1972, abandoned. This application May 18, 1976, Ser. No. 687,570
Claims priority, application Japan, May 28, 1975, 50-62869
Int. Cl.² C08G *18/32, 18/14*
U.S. Cl. 260—77.5 AM **6 Claims**

1. Polyurethanes prepared by a process which comprises a reacting

a. polyisocyanates
b. higher molecular weight compounds containing active hydrogen atoms with molecular weights of from about 750 to about 10,000
c. polyamines of the formula



wherein R is a saturated or unsaturated C_1 to C_{18} alkyl radical; C_3 to C_{10} cycloalkyl radical; C_7 to C_{11} aralkyl radical or C_6 to C_{10} aryl radical; and R' and R'' are the same or different and represent C_2 to C_{30} alkylene radicals which may be interrupted by oxygen atoms.

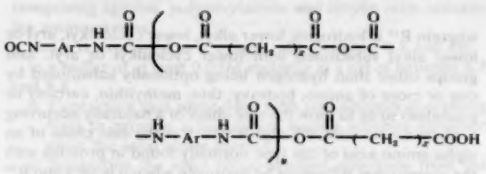
4,016,144

PREPARATION OF POLYAMIDE FROM OLIGOMERIC POLY-N-CARBOXYLIC ANHYDRIDE

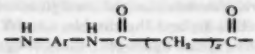
James N. Tilley, Cheshire, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 508,990, Sept. 25, 1974, Pat. No. 3,922,295. This application Sept. 5, 1975, Ser. No. 610,742
Int. Cl.² C08G *18/10, 69/00*
U.S. Cl. 260—78 R 10 Claims

1. A process for converting an oligomeric poly N-carboxylic anhydride consisting essentially of



wherein Ar represents an arylene radical, *x* represents an integer from 1 to 10, and y represents a number having an average value from 0 to 4 inclusive into a film forming polyamide having the recurring unit



wherein Ar and *x* are as defined hereinabove said process comprising heating said oligomeric poly N-carboxylic anhydride at a temperature of from about 80° to about 325° C so as to remove carbon dioxide.

4,016,145

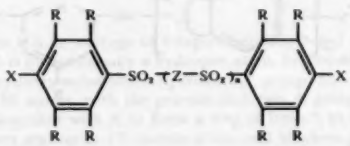
PRODUCTION OF AROMATIC SULFIDE/SULFONE POLYMERS

Robert W. Campbell, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

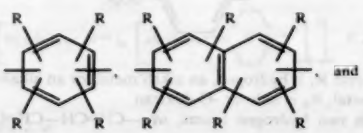
Continuation-in-part of Ser. No. 495,450, Aug. 28, 1974, Pat. No. 3,919,177, which is a continuation-in-part of Ser. No. 416,776, Nov. 19, 1973, abandoned. This application Sept. 23, 1975, Ser. No. 616,094
Int. Cl.² C08F *28/00*
U.S. Cl. 260—79.3 M 17 Claims

1. A process for the production of high molecular weight aromatic sulfide/sulfone polymers which comprises contacting

a. at least one dihalo aromatic sulfone represented by the formula



where each X is selected from the group consisting of fluorine, chlorine, bromine, and iodine; Z is a divalent radical selected from the group consisting of



and

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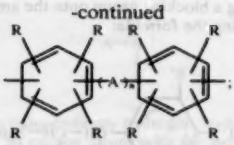
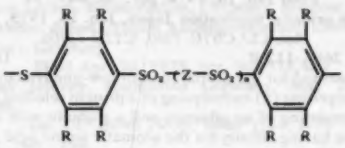


n is 0 or 1; A is selected from the group consisting of oxygen, sulfur, sulfonyl, and CR_2; and each R is selected from the group consisting of hydrogen and alkyl radicals having 1 to about 4 carbon atoms, the total number of carbon atoms in all of the R groups in the molecule being 0 to about 12,

b. at least one alkali metal sulfide selected from the group consisting of sodium sulfide, potassium sulfide, rubidium sulfide, and cesium sulfide,

c. at least one alkali metal carboxylate represented by the formula $R'CO_2M$ wherein R' is a hydrocarbyl radical and M is an alkali metal, and

d. at least one organic amide, under polymerization conditions including an elevated temperature, a period of time, and proportions of reactants sufficient to cause the reactants to react with each other and from an aromatic sulfide/sulfone polymer having recurring



units, where each R, Z, and *n* is as defined above.

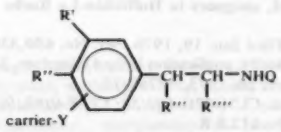
4,016,146

PHENETHYLAMINE ANTIGENIC CONJUGATES, THEIR PREPARATION, ANTIBODIES, AND USE

James R. Soares, Santa Monica, Calif., assignor to Biological Developments, Inc., Encino, Calif.

Filed Dec. 10, 1974, Ser. No. 531,219
Int. Cl.² C07C *103/52*; C07G *7/00*
U.S. Cl. 260—112 R 14 Claims

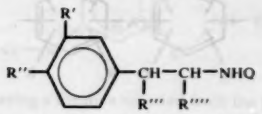
1. A process for producing a synthetic antigen of formula



where R' and R'' are individually selected from the class consisting of —H, —OH, and —OCH_3, where either R' or R'' is —OCH_3, the other is —OH; R''' is selected from the class consisting of —H and —OH; R'''' is selected from the class consisting of —H, —OCH_3, and —C_2H_5; Q is selected from the class consisting of —H and —CH_3; Y is a linking group which is the residue of the reaction of a coupling agent with a reactive group derivatized into the phenyl ring and of the coupling agent with the carrier, and the carrier is a macromolecule conferring antigenicity; where said reactive group is and said Y group includes a -N = N- or a group having the formula

where Q' is an alkylene chain having up to 20 carbon atoms; comprising

1. substituting a blocking group onto the amine of a phenylamine having the formula:



to form an amine blocked phenethylamine;

2. forming a derivative on the phenyl ring of the amine-blocked phenethylamine;
3. coupling the derivative to a carrier; and
4. removing the blocking group and reforming the amine to yield the phenethylamine conjugated to the carrier through the ring derivative.

4,016,147

METHOD FOR PREPARATION OF LOW-PHENYLALANINE PLASTEIN

Masao Fujimaki, Tokyo; Soichi Arai, Yokohama, and Michiko Watanabe, Matsudo, all of Japan, assignors to Fuji Oil Company, Ltd., Osaka, Japan

Filed Jan. 16, 1976, Ser. No. 649,794

Claims priority, application Japan, Jan. 16, 1975, 50-7471

Int. Cl.² C07G *7/00*; C12D *13/06*

U.S. Cl. 260—112 R **16 Claims**

1. A method for the preparation of low-phenylalanine plasteins comprising (a) hydrolyzing of a protein selected from the group consisting of an albumin and a globulin with an endopeptidase having affinity for the aromatic amino acid constituents of said protein and subsequently with an exopeptidase to give a hydrolyzate, (b) subjecting the resulting hydrolyzate to a gel-filtration to divide it into two fractions, the one containing the aromatic amino acid components and the other containing no or few aromatic amino acids, and (c) subjecting the latter fraction to a plastein synthesis.

4,016,148

PEPTIDE DERIVATIVES OF PHOSPHONIC AND PHOSPHINIC ACIDS AND INTERMEDIATES THEREFOR

Frank Ratcliffe Atherton, Welwyn Garden City; Michael John Hall; Cedric Herbert Hassall, both of Welwyn; Peter Stuart Ringrose, Royston, and Robert Wilson Lambert, Welwyn, all of England, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

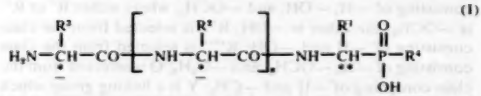
Filed Jan. 19, 1976, Ser. No. 650,336

Claims priority, application United Kingdom, Jan. 27, 1975, 3417/75; Nov. 20, 1975, 47787/75

Int. Cl.² C07C *103/52*; C07F *9/30*, *9/38*

U.S. Cl. 260—112.5 R **10 Claims**

1. A compound of the formula

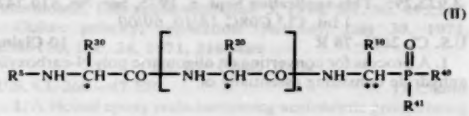


(I)

wherein R^1 is hydrogen, lower alkyl, lower cycloalkyl, lower alkyl substituted with lower cycloalkyl or aryl, said groups other than hydrogen being optionally substituted by one or more of amino, hydroxy, thio, methylthio, carboxy or guanidino so as to form the side chain of a naturally occurring L alpha-amino acid; R^2 and R^3 each is the side chain of an alpha-amino acid of the type normally found in proteins with the proviso that R^3 cannot be hydrogen when n is zero and R^1 is hydrogen or phenyl; R^4 is hydroxy or methyl; *n* is zero, 1, 2 or 3; the single asterisks denote that the configuration at the carbon atom so-marked is L; and the double asterisk denotes that when R^1 is other than hydrogen, the configuration at the carbon atom so-marked is R.

and pharmaceutically acceptable salts thereof,

9. A compound of the formula



(II)

wherein R^{10} is hydrogen, lower alkyl, lower cycloalkyl, aryl or lower alkyl substituted with lower cycloalkyl or aryl, said groups other than hydrogen being optionally substituted by one or more of amino, hydroxy, thio, methylthio, carboxy or guanidino so as to form the side chain of a naturally occurring L alpha-amino acid; R^{20} and R^{30} each is the side chain of an alpha-amino acid of the type normally found in proteins with the proviso that R^{30}cannot be hydrogen when *n* is zero and R^{10} is hydrogen or phenyl; except that any amino group or amino groups present may be in protected form utilizing a conventional amino protecting group and any other functional group which may be present is in protected form where required, R^{40} is methyl or R^{41}, R^{41} is hydroxy or lower alkoxy, R^5 is hydrogen or a conventional amino protecting group, *n* is zero, 1, 2 or 3; the single asterisks denote that the configuration at the carbon atom so-marked is L; and the double asterisk denotes that, when R^1 is other than hydrogen, the configuration at the carbon atom so-marked is R.

4,016,149

SELECTIVE REMOVAL OF ALBUMIN FROM BLOOD FLUID AND COMPOSITIONS THEREFORE

James Travis, and Ralph Pannell, both of Athens, Ga., assignors to Research Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 396,036, Sept. 10, 1973, abandoned. This application Aug. 4, 1975, Ser. No. 601,676

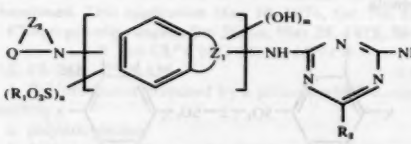
Claims priority, application France, Sept. 10, 1974, 74.30595; Italy, Sept. 10, 1974, 27141/74

Int. Cl.² A23J *1/00*

U.S. Cl. 260—122 **19 Claims**

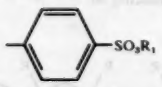
1. A method of removing albumin from substantially cell free aqueous fluids containing the same comprising the steps of

a. suspending a composition of the general formula $[SP]_z$ — [CRD] wherein CRD is color reactive dye of the general formula



wherein

R_3 is hydrogen, alkyl, phenyl, alkoxy phenyl, alkyl phenyl, or



wherein R_1 is hydrogen, an alkali metal, or an alkaline earth metal, R_2 is halo or -O-dextran

Z_1 is two hydrogen atoms, or —CH=CH—CH=CH— to

form a naphthyl nucleus with the phenyl nucleus to which it is attached,

Z_2 is one bond of a nitrogen-nitrogen bond or a hydrogen attached to the nitrogen shown only,

Q is substituted or unsubstituted aryl where Z_2 is hydrogen, or Q is substituted or unsubstituted aryl-N= where Z_2 is one bond of a double bond,

m is 1 or 0, n is 1 or 2,

provided that the substituent groups aforesaid are other than halo or heavy metal wherein heavy metal is defined as a metal falling in periodic groups other than 2A, 3A or 4A. and wherein SP is a solid support phase selected from the group comprising agarose, polyacrylamide and acrylic resin containing amino groups

and x is expressed as a weight ratio between 0.8 and 40,

in a buffer of at least 0.05M molarity at a pH of between 6.5 and 8.5,

b. Contacting said suspension with said albumin containing fluid to provide a suspension having albumin absorbed upon the solid phase thereof,

c. Separating the solid phase-albumin adsorbate from the aqueous phase.

4,016,150

SULFUR AND NITROGEN-CONTAINING ORGANIC COMPOSITIONS PROCESSES FOR MAKING THEM AND FUELS AND ADDITIVES CONTAINING THEM

Herbert Frederick Wiese, deceased, late of Cleveland, Ohio, by Helen G. Wiese, executrix, Mayfield Village, Ohio, and Emil Thomas Wierber, Mayfield Village, Ohio, assignors to The Lubrizol Corporation, Cleveland, Ohio

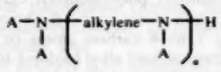
Division of Ser. No. 401,494, Sept. 27, 1973, Pat. No. 3,912,641. This application May 1, 1975, Ser. No. 573,706

Int. Cl.² C07G *17/00*

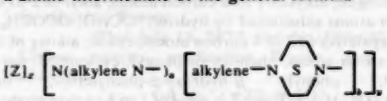
U.S. Cl. 260—128 20 Claims

1. A process for preparing sulfur- and nitrogen-containing organic compositions which comprises reacting at a temperature above about 0° C. (A) at least one amino compound chosen from the group consisting of amines, hydroxy amines, heterocyclic amines, polyamines, hydrazines, substituted hydrazines, hydroxyl amines and ammonia, (B) carbon disulfide, and (C) at least one halogenated aliphatic hydrocarbon of at least about 25 carbon atoms, said halogenated hydrocarbon (C) having between about 0.1 and 15% halogen.

11. A sulfur- and nitrogen-containing organic composition prepared by the process which comprises reacting at a temperature above about 0° C. (A) at least one polyalkylene polyamine of the general formula



wherein a is an average of integers between 1 and about 10, each A is independently a hydrogen atom, hydrocarbyl group of a hydroxy-substituted hydrocarbyl group having up to about 30 atoms, with the proviso that two A groups can be taken together with A to form a ring of from 5 to 6 annular members and up to 12 carbon atoms and alkylene is a lower alkylene group having between 1 and 10 carbon atoms, and (C) at least one halogenated substantially aliphatic hydrocarbon of at least 25 carbon atoms, said halogenated hydrocarbon (C) having between about 0.1 and 15% halogen, to form a amino intermediate of the general formula



wherein Z is

when x=1; A is independently hydrogen, hydrocarbyl of from 1 up to about 30 carbon atoms with the proviso that two A groups can be taken together with A to form a ring of from 5 to 6 annular members and up to 12 carbon atoms; alkylene is as defined above; R′ is an aliphatic hydrocarbon radical from about 400 to 100,000 number average molecular weight; a is an average of integers of from 0 to about 5; $a+2b$ is an average of integers of from 1 to about 10; c is an average of integers of from 1 to about 10 and is equal to or less than the number of amino groups in the molecule; x is 0 or 1; y is 0 or 1; and $x+y$ equals 1, and then reacting said intermediate with (B) carbon disulfide.

4,016,151

PHENYL-SUBSTITUTED PHTHALAZONE AZO DYES WITH A COUPLING COMPONENT OF THE PHENOL, NAPTHOL, ACETOACETARYLIDE, PYRAZALONE, QUINOLONE, PYRIDONE, PYRIMIDONE, OR ISOQUINOLONE SERIES

Wolfgang Lotsch, Beindersheim, Germany, assignor to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

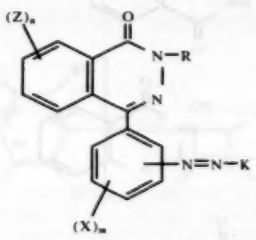
Filed Apr. 28, 1975, Ser. No. 572,420

Claims priority, application Germany, May 21, 1974, 2424538

Int. Cl.² C09B *29/36*; D06P *1/52*, *1/76*

U.S. Cl. 260—154 9 Claims

1. A dye of the formula



in which

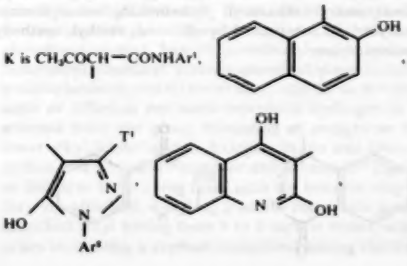
R is hydrogen; phenyl; phenyl substituted by chloro, bromo, methyl, ethyl, methoxy, ethoxy, cyano, nitro, sulfamoyl, N-phenylsulfamoyl, phenylsulfonyl, carbamoyl, N-phenylcarbamoyl, acetylamino or benzoylamino; or naphthyl;

m is 1 to 2;

n is zero, 0, 1, 2, 3 or 4;

X is chloro;

Z is chloro or bromo; and



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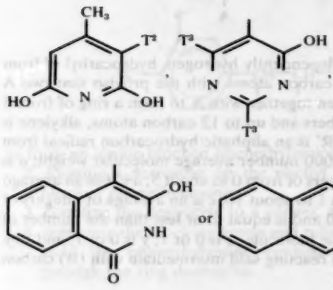
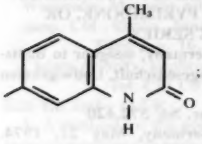
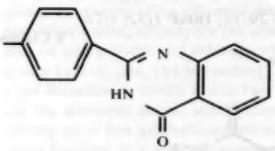
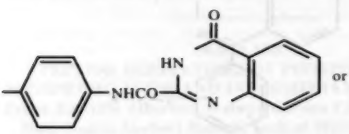
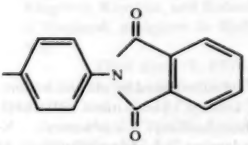




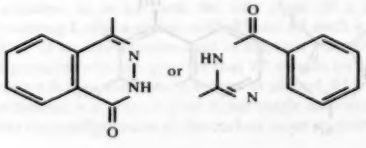






Ar^2 is phenyl or phenyl substituted by chlorine, methyl or sulfamoyl,

Ar^3 is phenyl; phenyl substituted by chlorine, bromine, nitro, methoxy, ethoxy, alkyl of 1 to 4 carbon atoms, carbamoyl sulfamoyl, N-phenylcarbamoyl, N-chloro-, N-methyl- or N-methoxyphenylcarbamoyl, N-β-anthraquinonyl-carbamoyl, phthalimido, benzoylamino, benzoylamino substituted by chlorine, methyl, methoxy or acetylamino;



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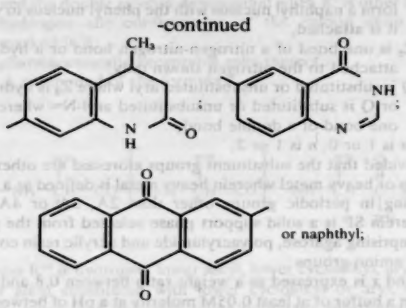


T^1 is methyl or carbamoyl;

T^2 is cyano or carbamoyl; and

T^3 is hydroxyl or amino.

4,016,152

AZO DYE WITH A 2,6-DIAMINO-5-CYANO-OR-5-CARBAMOYL-PYRIDINE COUPLING COMPONENT

Johannes Dehnert, and Gunther Lamm, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

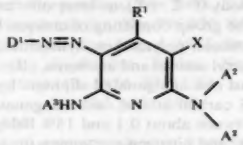
Continuation-in-part of Ser. No. 209,431, Dec. 17, 1971, abandoned. This application Aug. 26, 1974, Ser. No. 500,640

Claims priority, application Germany, Dec. 19, 1970, 2062717

Int. Cl.[2] C09B 29/36; D06P 3/24, 3/40, 3/52

U.S. Cl. 260—156 **14 Claims**

1. A dye of the formula



where

D^1 is phenyl substituted by chlorine, bromine, trifluoromethyl, methyl, ethyl, methoxy, nitro, cyano, methylsulfonyl, ethylsulfonyl, phenylsulfonyl, carbalkoxy of a total of 2 to 5 carbon atoms, carbo-β-alkoxyethoxy, said alkoxy having 1 to 4 carbon atoms or N,N-dialkyl-substituted sulfamoyl, said alkyl having 1 to 3 carbon atoms; phenylazophenyl; phenylazophenyl substituted by methyl, chlorine, bromine or nitro; benzthiazolyl; benzthiazolyl substituted by nitro, cyano, methylsulfonyl or ethylsulfonyl; benzisothiazolyl substituted by chlorine, bromine, cyano or nitro; thiazolyl substituted by cyano or nitro; thienyl substituted by methyl, cyano, nitro or carbalkoxy of a total of 2 to 5 carbon atoms; or thiadiazolyl substituted by phenyl, methyl, chlorine, bromine, methylmercapto, ethylmercapto or alkoxycarbonylethylmercapto, said alkoxy having 1 to 4 carbon atoms;

R^1 is hydrogen or alkyl of 1 to 3 carbon atoms;

X is carbamoyl or cyano;

A^3 is hydrogen, alkyl of 1 to 8 carbon atoms; alkyl of 2 to 8 carbon atoms substituted by hydroxy, OCHO, $OCOCH_3$, hydroxyalkoxy of 2 to 4 carbon atoms, cyano, alkoxy of 1 to 8 carbon atoms, phenoxy or phenyl; cyclohexyl; norbornyl; phenyl; β-hydroxy-β-phenylethyl; or $(CH_2)_2(OC_2H_4)_mOT$ and T is alkyl of 1 to 4 carbon atoms, benzyl or phenyl, m is 1 to 2,

each A^2, which can be the same or different, is alkyl of 1 to 4 carbon atoms, hydroxyalkyl of 2 or 3 carbon atoms,

alkoxyalkyl of 1 to 4 carbon atoms in the alkoxy and 2 or 3 carbon atoms in the alkyl, cyclohexyl or phenyl and

is pyrrolidino, piperidino, morpholino, hexamethyleneimino, piperazino, N-methylpiperazino or N-β-hydroxyethylpiperazino.

4,016,153

MONOAZO DYESTUFF MIXTURES DERIVED FROM 2-AMINO-5-NITRO-THIAZOLE AND BIS-HYDROXYALKYLAMINO ACKLANILIDES REACTED WITH ACID HALIDES AND AMIDES

Edgar E. Renfrew, Flemington, Pa., assignor to American Color & Chemical Corporation, Charlotte, N.C.

Continuation-in-part of Ser. No. 378,003, July 10, 1973, abandoned. This application Dec. 13, 1974, Ser. No. 532,398

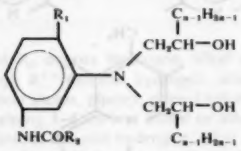
Int. Cl.² C09B *29/08, 29/26, 43/18*

U.S. Cl. 260—158 **5 Claims**

1. The monoazo dye mixture consisting essentially of the reaction product of

a. diazotized 2-amino-5-nitrothiazole; and

b. a coupling component of the formula



wherein

R_1 is hydrogen or lower alkoxy;

R_2 is alkyl of 1–4 carbon, phenyl, tolyl or chlorophenyl; and

n is 1 or 2;

the hydroxyalkyl groups of the coupling component being reacted prior to or subsequent to coupling with at least stoichiometric quantities of both:

1. a lower alkyl chlorocarbonate, acetyl chloride, propionyl chloride, benzoyl chloride, methylbenzoyl chloride, ethylbenzoyl chloride, phthaloyl chloride, terephthaloyl chloride, isophthaloyl chloride, butyryl chloride, a lower alkylsulfonylchloride, an arylsulfonylchloride or thionyl chloride, and

2. a mono- or di-lower alkyl formamide or acetamide, at a temperature of 30°–100° C. until the reaction mixture is substantially free of unreacted coupling component.

4,016,154

NOVEL DERIVATIVE OF N-(3,4,5-TRIMETHOXY CINNAMOYL) PIPERAZINE, ITS ACID ADDITION SALTS, ITS PROCESS OF PREPARATION AND ITS THERAPEUTIC APPLICATION

Michel J. Turin, Paris; Guy M. Raynaud, Meudon La Foret; Bernard M. Pourrias, Rueil Malmaison, and Patrick G. Guerret, Paris, all of France, assignors to Delalande S.A., Courbevoie, France

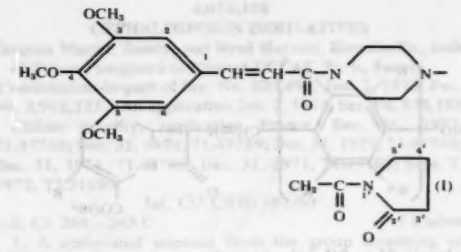
Filed July 15, 1975, Ser. No. 596,041

Claims priority, application France, July 17, 1974, 74.24831

Int. Cl.² C07D *403/02*

U.S. Cl. 260—240 J **2 Claims**

1. N-(3,4,5-trimethoxy cinnamoyl)-N′-(2′-pyrrolidinone-1′-carbonylmethyl) piperazine of formula (I):



and the pharmacologically acceptable acid addition salts thereof.

4,016,155

PROCESS FOR PREPARING CEPHALOSPORIN DERIVATIVES

Hiroaki Yanagisawa; Akiko Ando; Masami Fukushima, and Hideo Nakao, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

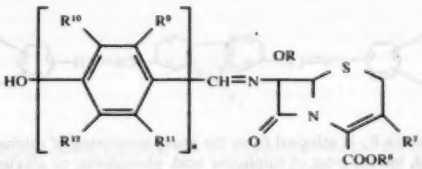
Filed Aug. 28, 1974, Ser. No. 501,245

Claims priority, application Japan, Sept. 7, 1973, 48-100856

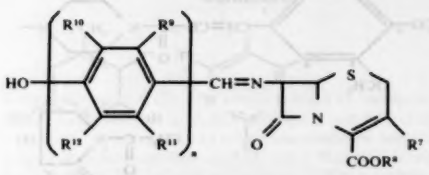
Int. Cl.² C07D *501/02*

U.S. Cl. 260—240 G **24 Claims**

1. A process for preparing a compound having the formula



wherein R^7 represents hydrogen or a group selected from the group consisting of methyl, cyanomethyl, acetoxymethyl, propionyloxymethyl, pivaloyloxymethyl, benzoyloxymethyl, carbamoyloxymethyl, methoxymethyl, ethoxymethyl, butyloxymethyl, methylthiomethyl, ethylthiomethyl, propylthiomethyl, 2-pyridylthiomethyl, 2-(1,3,5-triazolo)thiomethyl, 3-pyrazolothiomethyl, 1-imidazolinylthiomethyl, 5-methyl-1,3,4-thiodiazolyl-2-thiomethyl and 1-methyl-1H-tetrazol-5-ylthiomethyl, R^8 represents a group selected from the group consisting of straight or branched lower alkyl, lower alkoxymethyl, benzyloxymethyl, lower alkanoyloxy lower alkyl, benzoyloxymethyl, cyanomethyl, 2,2,2-trichloroethyl, phthalimidomethyl, benzyl, p-methoxybenzyl, p-nitrobenzyl, benzhydryl, phenacyl, p-bromophenacyl, p-methoxyphenacyl, p-nitrophenacyl, and tri lower alkyl silyl, R^9 to R^{12} may be the same or different and each represents hydrogen or a group selected from the group consisting of straight or branched lower alkyl, lower alkoxy, halogen, cyano and lower alkoxycarbonyl or R^9 and R^{10} together and R^{11} and R^{12} together may be linked to form a ring fused with the benzene ring to which they are attached, n is 1 or 2 and R represents a straight or branched alkyl having from 1 to 6 carbon atoms, which comprises contacting a cephem compound having the formula



wherein R^7 to R^{12} and n have the same meanings as defined above, with a metal oxide in an inert solvent or with a quinone compound substituted with an electron attractive group, and contacting the resulting oxidation product with an alkanol having the formula

R - OH

wherein R has the same meaning as defined above, said metal oxide being one which oxidizes phenol to a quinoid form without destruction of the cephem or penam nucleus.

4,016,156

DISTYRYL COMPOUNDS

Kurt Weber, Basel, and Geza Kormany, Allschwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

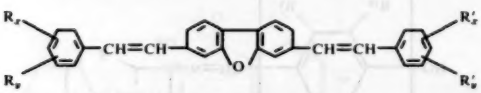
Continuation of Ser. No. 374,141, June 27, 1973, abandoned. This application Dec. 16, 1975, Ser. No. 641,319

Claims priority, application Switzerland, June 30, 1972, 9854/72

Int. Cl.² C07D *307/91*

U.S. Cl. 260—240 D **8 Claims**

1. Distyryl-dibenzofuranes of the formula



wherein R_z is selected from the group consisting of sulphonic acid, benzyl ester of sulphonic acid, phenylester or alkylester of sulphonic acid with 1 to 18 carbon atoms in the alkyl part, alkylsulphone of 1 to 4 carbon atoms, phenylsulphone, a sulphonamide, a carboxylic acid, a carboalkoxy of 2 to 9 carbon atoms or a nitrile, R_z' is selected from the group consisting of sulphonic acid, benzylester of sulphonic acid, phenylester or alkylester or sulphonic acid with 1 to 18 carbon atoms in the alkyl part, alkylsulphone of 1 to 4 carbon atoms, phenylsulphone, a carboxylic acid, a carboalkoxy of 2 to 9 carbon atoms, nitrile, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, chlorine or hydrogen, and R_y and R_y' independently of one another are hydrogen, sulphonic acid or a salt thereof, chlorine, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms.

4,016,157

METAL COMPLEXES OF BIS-HYDRAZONES

Laurent Vuitel, Monthey; Francois L'Eplattenier, Therwil, and Andre´ Pugin, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

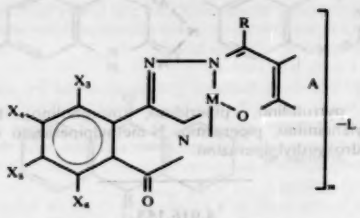
Filed Aug. 26, 1975, Ser. No. 607,968

Claims priority, application Switzerland, Sept. 5, 1974, 12101/74

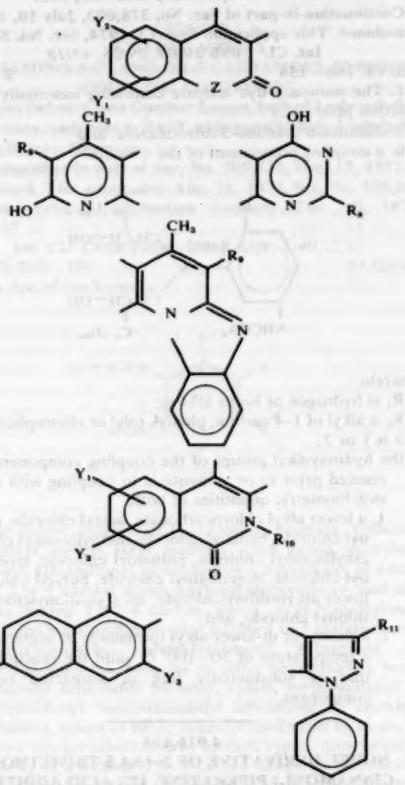
Int. Cl.² C07D *239/91, 405/12, 401/12*

U.S. Cl. 260—242 **16 Claims**

1. A bis-hydrazone metal complex of the formula

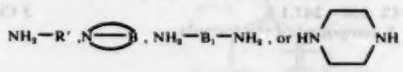


wherein A denotes

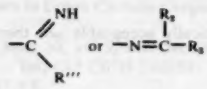


wherein M denotes a divalent transition metal, zinc or cadmium, Y_1 and Y_2 denote hydrogen, halogen, alkyl of 1–4 carbon atoms, alkoxy of 1–4 carbon atoms, or nitro; Z denotes —NH— or -oxygen-, R_8 denotes -OH, alkyl containing 1–4 carbon atoms, phenyl, phenyl substituted with halogen, alkyl of 1–4 carbon atoms, or alkoxy of 1–4 carbon atoms; R_9 denotes cyano, carboxyl, or carbamoyl; R_{10} denotes hydrogen, or alkyl; Y_3 denotes hydrogen, carboxyl, carbamoyl, phenylcarbamoyl or alkoxycarbonyl containing 2–6 carbon atoms; Y_4 denotes hydrogen, halogen, methoxy, nitro or cyano; R_{11} denotes alkyl of 1–4 carbon atoms, alkoxycarbonyl containing 2–5 carbon atoms, carboxyl, carbamoly,

wherein M_2 denotes Ca, Sr, Ba or Mn; L denotes

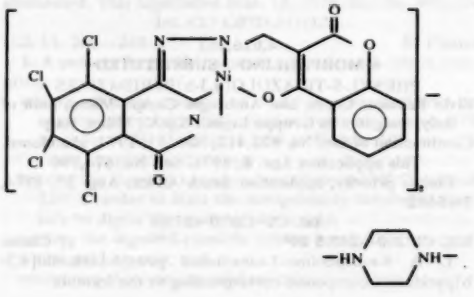


wherein R′ denotes hydrogen, hydroxyl, alkyl having 1–10 carbon atoms, phenalkyl containing 1–4 carbon atoms, cycloalkyl containing 5–6 carbon atoms, an aromatic group selected from the group consisting of phenyl, methylphenyl, chlorophenyl, or methoxyphenyl, amino, alkylamino containing 1–6 carbon atoms, or a group of the formulas



wherein R_2 and R_3 denote hydrogen, alkyl of 1–6 carbon atoms, or phenyl; R‴ denotes hydrogen, amino, alkyl containing 1–6 carbon atoms, phenyl, phenyl substituted by halogen, alkyl containing 1–4 carbon atoms or alkoxy containing 1–4 carbon atoms; R denotes hydrogen, alkyl containing 1–4 carbon atoms or phenyl; B denotes a radical which, conjointly with the N atoms, forms a heterocyclic ring selected from the group consisting of pyridine, quinoline, piperidine, or morpholine; B_1 denotes alkylene containing 2–10 carbon atoms, phenylene, a group —Ph—X—Ph— wherein X denotes a direct bond, —O—, —S—, methylene, ethylene, -NH-, $—SO_2—$, —CO— or —N=N—; X_3 denotes hydrogen, halogen, alkoxy containing 1–6 carbon atoms, nitro, carboxyl, carbamoyl, or alkanolyamino containing 2–6 carbon atoms; X_4 denotes hydrogen or chloro; X_5 denotes hydrogen, chloro, alkoxy, containing 1–6 carbon atoms, alkylmercapto containing 1–6 carbon atoms, phenalkoxy having an alkyl containing 1–4 carbon atoms or phenoxy; X_6 denotes hydrogen, chloro, nitro, carboxyl, carbamoyl, alkylcarbamoyl containing 2–6 carbon atoms, alkanoylamino containing 2–6 carbon atoms or phenylcarbamoyl; and m denotes the number 1–2.

16. The compound as claimed in claim **1** of the formula



4,016,158
CEPHALOSPORIN DERIVATIVES

Jacques Martel, Bondy, and René Heymes, Romainville, both of France, assignors to Roussel-UCLAF, Paris, France

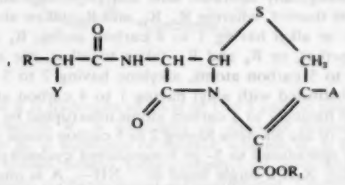
Continuation-in-part of Ser. No. 320,493, Jan. 2, 1973, Pat. No. 3,962,223. This application Jan. 2, 1975, Ser. No. 538,189

Claims priority, application France, Dec. 31, 1971, 71.47758; Dec. 31, 1971, 71.47759; Dec. 31, 1971, 71.47760; Dec. 31, 1971, 71.47761; Dec. 31, 1971, 71.47762; Sept. 7, 1972, 72.31699

Int. Cl.³ C07D *501/60*

U.S. Cl. 260—243 C **7 Claims**

1. A compound selected from the group consisting of desacetoxycephalosporins of the formula



in racemic or optically active form or cis and trans forms and mixtures thereof wherein R is selected from the group consisting of aminophenyl and R′, R′ is selected from the group consisting of phenyl optionally substituted with one member of the group consisting of halogen and nitro and a 5 to 6 member heterocyclic group selected from the group consisting of thienyl and pyridyl, Y is selected from the group consisting of amino, NHCOOR″, where R″ is alkyl of 1 to 5 carbon atoms, hydrogen and hydroxy, A is selected from the group consisting of in which at least 2

of R_2, R_3 and R_4 are alkyl of 1 to 3 carbon atoms and the third is hydrogen or alkyl of 1 to 3 carbon atoms with the total number of carbon atoms being not greater than 5 and cycloalkyl of 3 to 7 carbon atoms and R_1 is selected from the group consisting of hydrogen, alkyl of 1 to 6 carbon atoms, trichloroethyl, benzyl and methoxybenzyl with the proviso that when R is aminophenyl Y is other than amino and NHCOOR″ and R_1 is hydrogen and when Y is amino, R_1 is hydrogen and the non-toxic, pharmaceutically acceptable addition salts with organic and inorganic bases and acids where appropriate.

4,016,159
ACYLAMINO-CEPHEM-CARBOXYLIC ACIDS CONTAINING AN AMIDINO OR GUANIDINO GROUP IN THE MOLECULE

Dieter Bormann; Bernd Knabe, both of Kelkheim, Taunus; Elmar Schrinner, Wiesbaden, and Manfred Worm, Mainz, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

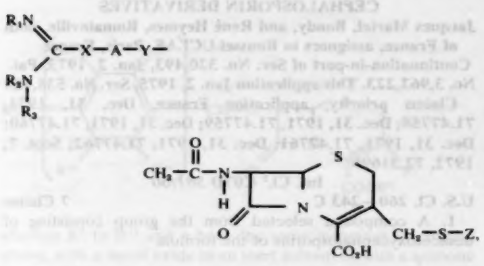
Filed Nov. 27, 1974, Ser. No. 527,704

Claims priority, application Germany, Nov. 29, 1973, 2359544

Int. Cl.³ C07D *501/56, 501/48*

U.S. Cl. 260—243 C **56 Claims**

1. An acylamino-cephem-carboxylic acid of the formula



and physiologically tolerated salts and physiologically tolerated esters thereof, wherein R_1, R_2, and R_3, taken alone, are hydrogen or alkyl having 1 to 8 carbon atoms; R_1 and R_2, taken together, or R_2 and R_3, taken together, are alkylene having 2 to 5 carbon atoms, alkylene having 2 to 5 carbon atoms substituted with alkyl having 1 to 4 carbon atoms or with alkyl having 1 to 4 carbon atoms interrupted by an oxygen atom, or are alkylene having 2 to 5 carbon atoms which is ortho- or spiro-fused to 5- or 6-membered cycloalkyl or oxacycloalkyl; X is a single bond or —NH—; A is phenylene, thienylene, or phenylene or thienylene substituted with alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, or halogen; Y is a single bond or —O—; and Z is is a heterocyclic ring selected from the group consisting of thienyl, furyl, pyrrolyl, imidazolyl, pyrazolyl, thiazolyl, thiazolinyl, oxazolyl, oxazolinyl, isoxazolyl, triazolyl, thiadiazolyl, oxadiazolyl, tetrazolyl thiatriazolyl, pyridyl, pyrimidyl, pyrazinyl, pyradiazinyl, thiazinyl, triazinyl, thiadiazinyl, imidazolinyl and tetrahydropyrimidyl, or Z is such a heterocyclic ring substituted by at least one member selected from the group consisting of alkyl having 1 to 15 carbon atoms, cyclopentyl, cyclohexyl, lower alkoxy, lower alkenyl, lower alkylmercapto, lower alkoxycarbonyl, lower alkoxycarbonylamino, amino, lower alkylamino, hydroxy, nitro, phenyl, lower alkoxyphenyl, halophenyl, hydroxyphenyl, aminophenyl, lower alkylphenyl, cetylphenyl, nitrophenyl, biphenylyl, pyridyl, methylpyridyl, furyl, naphthyl, quinolyl, isoquinolyl, thienyl, 2-thiazolyl, 2-pyrrolyl, 4-imidazolyl, 5-pyrazolyl, 4-isoxazolyl, and lower alkyl having 1 to 4 carbon atoms substituted by phenyl, phenoxy, lower alkoxy, or lower alkoxycarbonyl, or Z is such a heterocyclic ring ortho-fused to a benzene ring, or Z is pyridyl-N-oxide or pyridazinyl-N-oxide.

4,016,160

7-DIHALOALKANAMIDO-3-HETEROCYCLIC-THIOMETHYL-3-CEPHEM-4-CARBOXYLIC ACIDS

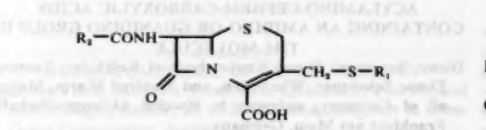
Takao Takaya, Sakai, and Takashi Masugi, Toyonaka, both of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed June 18, 1975, Ser. No. 587,854

Int. Cl.² C07D *501/20*

U.S. Cl. 260—243 C **10 Claims**

1. Compounds of the general formula:



wherein

R_1 is a triazolyl, tetrazolyl or thiadiazolyl group, which may be substituted with lower alkyl group, and

R_2 is dichloro(lower)alkyl group, and their nontoxic, pharmaceutically acceptable salts.

4,016,161

AMINO-SUBSTITUTED 1,2,3,4,10,14b-HEXAHYDRO-PYRIDINO[1,2-a]DIBENZO[c,f]AZEPINES

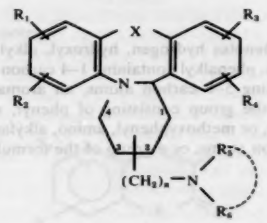
Willem Jacob van der Burg, Heesch, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.

Continuation of Ser. No. 463,712, April 24, 1974, Pat. No. 3,966,723. This application Jan. 14, 1976, Ser. No. 649,167

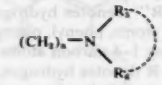
Int. Cl.² C07D *498/04*, *513/04*

U.S. Cl. 260—247.1 L **3 Claims**

1. A compound of the formula:



or a pharmaceutically acceptable salt thereof, wherein the group -



is present at position 2 or 3 and in which:

x is selected from oxygen and sulphur,

R_1, R_2, R_3 and R_4 represent hydrogen, hydroxy, halogen, alkyl containing 1 to 6 carbon atoms, alkoxy containing 1 to 6 carbon atoms, alkylthio containing 1 to 6 carbon atoms or trifluoromethyl,

R_5, R_6 represent hydrogen, alkyl containing 1 to 6 carbon atoms, phenylalkyl, the alkyl containing 1 to 14 carbon atoms, or R_5 together with R_6 and the nitrogen atom represent a heterocyclic 5 or 6 membered ring selected from the group consisting of pyrrolino, pyrrolidino, piperidino, oxazolidino, morpholino, and piperazino, and

n is the number 0, 1, 2 or 3.

4,016,162

6-MORPHOLINO-3-SUBSTITUTED PHENYL-S-TRIAZOLO[4,3-b]PYRIDAZINES

Elvio Bellasio, Como, and Ambrogio Campi, Milan, both of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

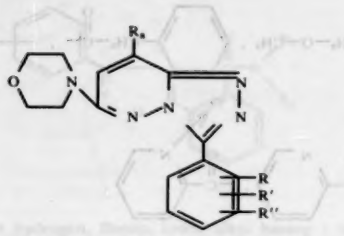
Continuation of Ser. No. 522,412, Nov. 11, 1974, abandoned. This application Apr. 8, 1976, Ser. No. 674,790

Claims priority, application South Africa, Aug. 27, 1974, 74/5482

Int. Cl.² C07D *487/04*

U.S. Cl. 260—247.5 DP **7 Claims**

1. A 6-morpholino-3-substituted phenyl-s-triazolo[4,3-b]pyridazine compound corresponding to the formula



wherein R, R′ and R″ each independently represent hydrogen, hydroxy, loweralkyl, lower alkoxy, halo or nitro, and wherein R_a represents hydrogen or loweralkyl, and their pharmacologically acceptable salts.

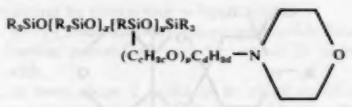
4,016,163

MORPHOLINO-BEARING POLYALKYL-SILOXANES

Bernard Kanner, West Nyack, and Bela Prokai, Mahopac, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed June 30, 1975, Ser. No. 592,076
Int. Cl.² C07D *295/10*
U.S. Cl. 260—247.7 L **16 Claims**

1. Morpholino-polyalkylsiloxanes having the average composition,



wherein: R is alkyl of one to four carbon atoms, *x* has an average value from about 0.5 to about 8; *y* has an average value from about 0.5 to about 8; *p* is zero or one; *c* is an integer having a value from two to four; and *d* is an integer having a value from two to six.

4,016,164

PROCESS FOR PURIFYING CRUDE CYANURIC ACID

Sidney Berkowitz, Highland Park, and John D'Angelo, Old Bridge, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 447,824, March 4, 1974, abandoned. This application Mar. 18, 1976, Ser. No. 668,304
Int. Cl.² C07D *251/32*
U.S. Cl. 260—248 A **17 Claims**

1. A process for purifying crude cyanuric acid, which comprises:

mixing sufficient amounts of crude cyanuric acid with an aqueous phosphoric acid solution containing about 10% to about 85% phosphoric acid to form a 10% to 45% crude cyanuric acid slurry;

heating the slurry to a temperature of about 180° C to about 220° C under at least the autogenously developed pressure to digest the crude cyanuric acid;

cooling the digested cyanuric acid to precipitate the cyanuric acid crystals; and

recovering the cyanuric acid crystals.

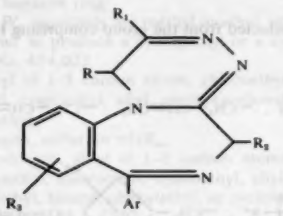
4,016,165

TRIAZINO BENZODIAZEPINES

Robert Bruce Moffett, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Feb. 9, 1976, Ser. No. 656,371
Int. Cl.² C07D *253/08*
U.S. Cl. 260—248 AS **11 Claims**

1. A compound of the formula IV



IV

wherein R is hydrogen or alkyl of 1 to 3 carbon atoms, inclusive; wherein R_1 is hydrogen or alkyl as defined above; wherein R_2 is hydrogen or methyl; wherein R_3 is hydrogen, fluoro, chloro, bromo, trifluoromethyl, or nitro; and wherein A is phenyl, o-chlorophenyl, o-fluorophenyl, 2,6-difluorophenyl, or 2-pyridyl, and the pharmacologically acceptable acid addition salts thereof.

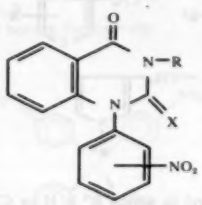
4,016,166

1-NITROPHENYLQUINAZOLINE-2,4(1H,3H)-DIONES

Kanji Noda, Chikushino; Akira Nakagawa, Tosu; Terumi Hachiya, Chiyoda, and Hiroyuki Ide, Fukuoka, all of Japan, assignors to Hisamitsu Pharmaceutical Co., Inc., Japan

Filed Dec. 9, 1974, Ser. No. 531,097
Claims priority, application Japan, Dec. 14, 1973, 48-140556; Mar. 1, 1974, 49-24999; Mar. 28, 1974, 49-35325
Int. Cl.² C07D *239/95, 239/96*
U.S. Cl. 260—251 QA **14 Claims**

1. A compound of the general formula:



wherein R is selected from the group consisting of hydrogen, lower alkyl groups having from one to 6 carbon atoms, lower alkenyl groups having from 3 to 5 carbon atoms, propargyl, cyclopropylmethyl, haloethyl, trihaloethyl, acetoxyethyl, alkoxyalkyl groups having from 2 to 4 carbon atoms, lower hydroxyalkyl groups having from 2 to 3 carbon atoms, hydroxyethoxyethyl, ethoxycarbonylmethyl and benzyl; X is selected from the group consisting of O and S.

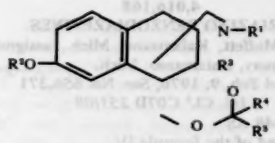
4,016,167

N-SUBSTITUTED-6,8-DIOXAMORPHINANS

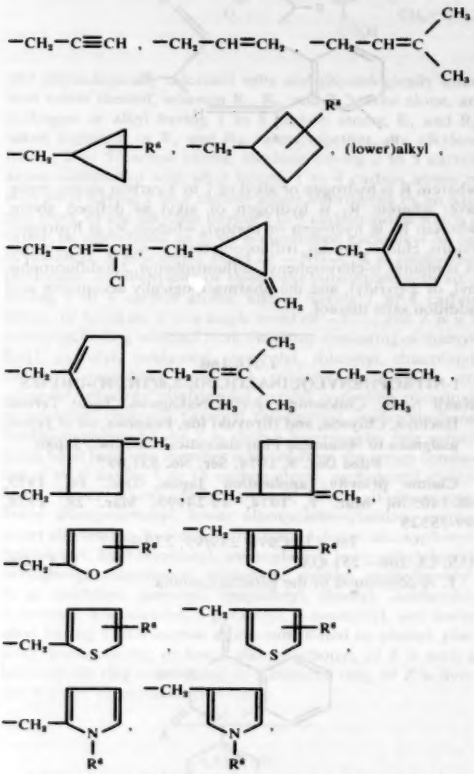
Thomas Alfred Montzka, Manlius, and John Daniel Matiskella, Liverpool, both of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Filed Oct. 28, 1975, Ser. No. 626,393
Int. Cl.² C07D *221/26*
U.S. Cl. 260—293.54 **28 Claims**

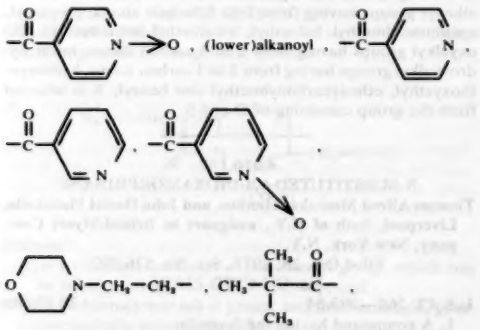
1. A compound having the formula



wherein R^1 is selected from the group comprising H,



and (lower)alkenyl in which R^6 is H or CH_3, R^2 is selected from the group comprising H, (lower)alkyl,



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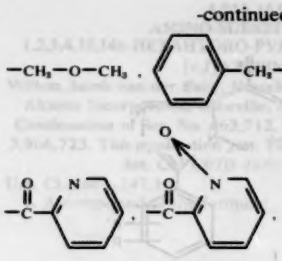


and cinnamoyl, R^3 is H or (lower)alkyl and R^4 and R^5 are alike or different and each is H, (lower)alkyl or trifluoromethyl, or when R^4 and R^5 are taken together they are a carbonyl or a spirocycloalkyl of 3 to 7 carbon atoms; or a pharmaceutically acceptable acid addition salt thereof.

4,016,168

PIPERIDINE DERIVATIVES

Keisuke Murayama, Syoji Morimura; Takao Yoshioka; Toshimasa Toda; Eiko Mori; Hideo Horiuchi; Susumu Higashida; Katsuaki Matsui; Tomoyuki Kurumada; Noriyuki Ohta, and Hisayou Osawa, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

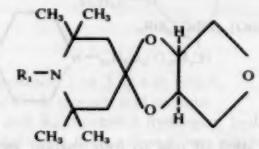
Division of Ser. No. 405,570, Oct. 11, 1973, Pat. No. 3,899,464. This application Feb. 26, 1975, Ser. No. 553,087

Claims priority, application Japan, Oct. 26, 1972, 47-107408

Int. Cl.² C07D *491/20*

U.S. Cl. 260—293.58 **2 Claims**

1. A compound having the formula



wherein R_1 represents hydrogen atom, methyl, or acetyl.

4,016,169

PROCESS FOR PREPARING TRICHLOROTHIAZOLE

Gunther Beck, Leverkusen, and Dieter Arlt, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 28, 1975, Ser. No. 626,416

Claims priority, application Germany, Oct. 30, 1974, 2451632

Int. Cl.³ C07D *277/32*

U.S. Cl. 260—302 R **9 Claims**

1. Process for preparing trichlorothiazole, which comprises reacting 1,2-dichloroethyl-isocyanide dichloride with a sulphur chloride selected from the group consisting of disulphur dichloride and sulphur dichloride at elevated temperatures in the presence of catalytic amounts of a Friedel-Crafts catalyst.

4,016,170

OXADIAZOLYL BENZAMIDES

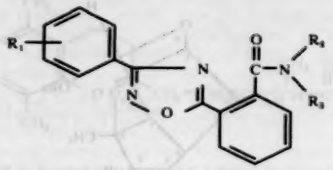
Jeffrey Nadelson, Lake Parsippany, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 599,851, July 28, 1975, abandoned. This application Nov. 18, 1975, Ser. No. 633,014

Int. Cl.² C07D *271/06*

U.S. Cl. 260—307 G **6 Claims**

1. A compound of the formula:

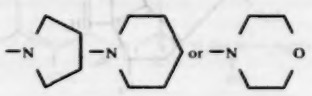


where

R_1 represents hydrogen, fluoro, lower alkyl having 1 to 4 carbon atoms, lower alkoxy having 1 to 4 carbon atoms, or trifluoromethyl, and

R_2 and R_3 each independently represents hydrogen or lower alkyl as defined above, and

R_2 and R_3 together with N represent



4,016,171

PROCESS FOR MAKING 2-VINYL-2-OXAZOLINES

Bruce P. Thill, and Janet N. Paige, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sept. 14, 1972, Ser. No. 288,914

Int. Cl.² C07D *263/12*

U.S. Cl. 260—307 F **13 Claims**

1. A process for making a 2-vinyl-2-oxazoline comprising the steps of

A. reacting by contacting in liquid phase

1. an N-(2-haloalkyl)-3-halopropionamide having a total carbon content of from 5 to about 20 carbon atoms, with

2. at least about 2 moles of an alkali or alkaline earth metal carbonate or an alkali metal hydroxide per mole of (1) or at least about 1 mole of alkaline earth metal hydroxide per mole of (1);

step (A) being conducted under substantially anhydrous conditions and in the presence of an alkylene glycol of 2–4 carbon atoms or apolymer thereof; and

B. recovering the 2-vinyl-2-oxazoline product.

4,016,172

AZOLINDOLINES AND AZOLINDOLINE DYESTUFFS

Horst Harnisch, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

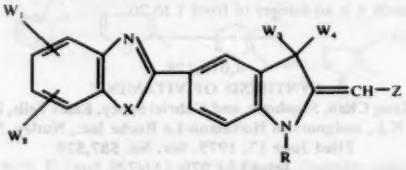
Division of Ser. No. 179,181, Sept. 9, 1971, Pat. No. 3,840,552. This application Jan. 17, 1974, Ser. No. 434,022

Claims priority, application Germany, Sept. 9, 1970, 2044620

Int. Cl.² C07D *263/56*

U.S. Cl. 260—307 D **6 Claims**

1. Azolindoline of the formula



wherein

W_1 is hydrogen, alkyl of 1–5 carbon atoms, cyclohexyl, phenyl, chloro, alkoxy of 1–5 carbon atoms, methylsulfonyl, ethylsulfonyl, dimethylaminosulfonyl, diethylaminosulfonyl, dimethylaminocarbonyl, diethylaminocarbonyl, methoxycarbonyl, ethoxycarbonyl, methoxyethoxycarbonyl, acetylamino, propionylamino, methylsulfonylamino, or trifluoromethyl;

W_2 is hydrogen or alkyl of 1–5 carbon atoms;

W_1 and W_2 additionally can be joined together to produce a fused benzene ring;

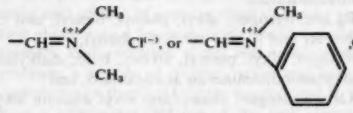
W_3 and W_4 separately are methyl or ethyl, or can be joined together to produce a cyclopentyl or a cyclohexyl ring; Ser. No. 434,022

R is alkyl of 1–5 carbon atoms, chloroethyl, bromoethyl, fluoroethyl, cyanoethyl, allyl, methoxycabonylethyl, benzyl, or phenylethyl;

X is oxygen, sulfur, or $=NR_4$;

R_4 is hydrogen, alkyl of 1–5 carbon atoms, chloroethyl, bromoethyl, fluoroethyl, cyanoethyl, allyl, methoxycarbonylethyl, benzyl, phenylethyl, or cyclohexyl; and

Z represents —H, —CHO,



4,016,173

OXINDOLE DIAMINES

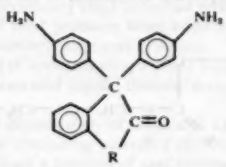
Franklin P. Darmory, Ardsley, and Marianne DiBenedetto, Pleasantville, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 443,287, Feb. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 204,301, Dec. 2, 1971, abandoned. This application Sept. 26, 1975, Ser. No. 617,223

Int. Cl.² C07D *209/38*

U.S. Cl. 260—325 R **2 Claims**

1. A compound having the formula:



wherein

R is a member selected from N-phenyl; N-phenyl substituted with at least one methyl, ethyl, propyl, chloro, bromo or nitro group; N-naphthyl, N-anthryl; and N-phenanthryl.

4,016,174

BENZOINDOLE PHTHALIDES

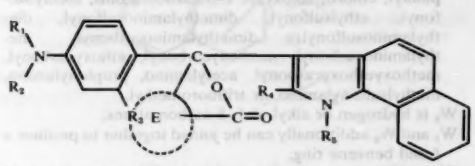
Sheldon Farber, Appleton, Wis., assignor to NCR Corporation, Dayton, Ohio

Filed Apr. 10, 1975, Ser. No. 566,854

Int. Cl.² C07D *405/04*

U.S. Cl. 260—326.14 R **4 Claims**

1. A compound represented by the formula:



wherein E is:

unsubstituted and alkyl-, chloro-, dichloro-, trichloro-, tetrachloro-, bromo-, dibromo-, tribromo-, tetrabromo-, nitro-, and dialkylaminosubstituted;

R_1 and R_2 are: hyrogen, alkyl, phenyl, benzyl, and cyclohexyl but R_1 and R_2 are not both phenyl;

R_3 is: hydrogen, alkyl, phenyl, alkoxy, halo, dialkylamino, monoalkylamino, amino an acetylamino; and

R_4 and Rare: hydrogen, phenyl and alkyl wherein alkyl, all occurrences, and alkoxy have 1 to 6 carbon atoms.

4,016,175

PREPARATION OF A 2-AMINO-PYRROLINE DERIVATIVE

Sijbrandus E. Schaafsma, Beek(L), and Leonardus H. Geurts, Sittard, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

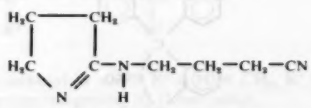
Filed Sept. 23, 1975, Ser. No. 616,012

Claims priority, application Netherlands, Sept. 26, 1974, 7412695

Int. Cl.² C07D *207/22*

U.S. Cl. 260—326.62 **9 Claims**

1. A process for the preparation of a 2-amino-pyrroline compound, comprising the step of heating γ-amino-butyronitrile at a temperature of 75°–250° C. in an inert atmosphere to form a 2-amino-pyrroline compound of the formula:



4,016,176

ESTERS OF 4-HYDROXY-2,9-DIOXATRICYCLO[4.3.1.0^{3,7}] DECANES AND PROCESSES FOR THEIR PRODUCTION

Peter Willibrord Thies, Hannover, Germany, assignor to Kali-Chemie Pharma GmbH, Hannover, Germany

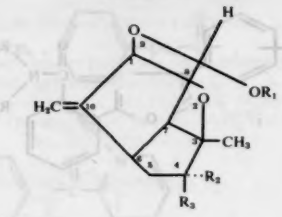
Continuation-in-part of Ser. No. 440,038, Feb. 6, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,081

Claims priority, application Germany, Feb. 8, 1973, 2306118

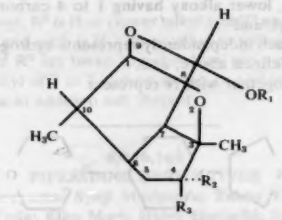
Int. Cl.² C07D *319/08*

U.S. Cl. 260—340.3 **22 Claims**

1. A compound of the group consisting of esters of 4-hydroxy-2,9-dioxatricyclo[4.3.1.0^{3,7}]decanes with carbamic acids having the formula



or



in which formulae R_1 is alkyl of at most 4 carbon atoms and one of R_2 and R_3 is hydrogen and the other is carbamyloxy having the formula —OCONHR, in which R is hydrogen, allyl, phenyl, cyclohexyl or alkyl of at most 4 carbon atoms.

4,016,177

XANTHOGEN DISULPHIDES WITH FUNCTIONAL GROUPS

Rudolf Mayer-Mader, and Wilhelm Göbel, both of Cologne, Germany, assignors to Bayer Aktiengesellschaft, Germany

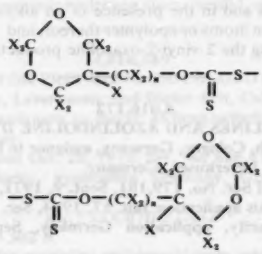
Division of Ser. No. 440,014, Feb. 6, 1974, Pat. No. 3,926,912. This application Apr. 21, 1975, Ser. No. 570,098

Claims priority, application Germany, Feb. 10, 1973, 2306610; May 23, 1973, 2352937

Int. Cl.² C07D *319/04*

U.S. Cl. 260—340.7 **3 Claims**

1. An xanthogen disulphide of the formula



wherein X may be the same or different and is selected from the group consisting of hydrogen, alkyl having 1 to 6 carbon atoms, phenyl, naphthyl, benzyl, chlorine, bromine and iodine and each *n* is an integer of from 1 to 20.

4,016,178

SYNTHESIS OF VITAMIN E

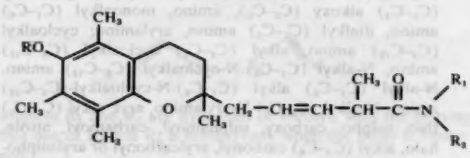
Ka-Kong Chan, Stanhope, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed June 17, 1975, Ser. No. 587,570

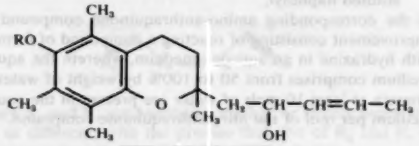
Int. Cl.² C07D *311/72*

U.S. Cl. 260—345.5 **2 Claims**

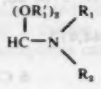
1. A process for producing a compound of the formula



wherein R is benzyl, trialkyl silyl, t-butyl, benzhydryl, trityl, tetrahydropyranyl, alpha-lower alkoxy-lower alkyl; and R_1 and R_2 are lower alkyl;
comprising reacting at a temperature of from 100° C to 400° C in an inert organic solvent medium a compound of the formula:



wherein R is as above; with a compound of the formula:



wherein R_1 and R are as above; and R_1' is lower alkyl.

4,016,179

CERTAIN ESTERS OF 2-SUBSTITUTED-4-HYDROXY-CYCLOPENT-2-ENONES

Keinei Fujimoto, Kobe; Nobuo Ohno, Toyonaka; Yoshitoshi Okuno, Toyonaka; Toshio Mizutani, Toyonaka; Isao Ohno, Minoo; Masachika Hirano, Toyonaka; Nobushige Itaya, Ikeda, and Takashi Matsuo, Amagasaki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

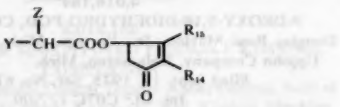
Division of Ser. No. 378,301, July 11, 1975. This application July 16, 1975, Ser. No. 596,333

Claims priority, application Japan, July 11, 1972, 47-69805

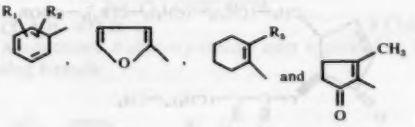
Int. Cl.² C07D *307/54*

U.S. Cl. 260—347.5 **7 Claims**

1. A substituted acetate compound of the formula



wherein Y is selected from the group consisting of the formulae;



in which R_1 and R_2 are each hydrogen, fluorine, chlorine, methyl, methoxy, butythio or acetyl or R_1 and R_2 are attached to adjacent carbon atoms and are bonded to one another to form trimethylene, R_5 is hydrogen or methyl; R_{14} is allyl, propargyl or benzyl; R_{15} is hydrogen or methyl; and Z is ethyl, isopropyl or allyl.

4,016,180

CHEMICAL CONCENTRATION BY ADSORPTION

Kenneth W. Baierl, Appleton, Wis., assignor to Flambeau Paper Company, Park Falls, Wis.

Filed June 18, 1975, Ser. No. 587,849

Int. Cl.² C07D *307/49;* **B01D** *15/06, 15/08;* **C07C** *53/08*

U.S. Cl. 260—347.9 **32 Claims**

1. A method of continuously concentrating a dilute liquid supply of chemicals to provide a concentrated supply of end products, said method comprising the steps of:

continuously directing a stream of said dilute supply of chemicals through a primary concentration zone containing a first adsorption media, and adsorbing at least a portion of said chemicals on the first media;

thereafter passing a first eluant through the first media for desorbing at least a portion of the adsorbed chemicals and producing a stream comprising primary stage desorbed products and first eluant;

passing said stream of primary stage desorbed products and first eluant into a fractionation column coupled with said primary concentration zone, and treating the same to produce a supply of primary stage end products more concentrated than said dilute supply, and to separate at least a substantial fraction of the first eluant from said primary stage end products, said treating including the steps of refluxing said stream of primary stage desorbed products and said eluant within the column, recycling the refluxed stream as necessary through the primary zone and column for substantially filling each of the latter with eluant, and collecting said supply of primary stage end products;

clearing said primary zone of eluant and collecting the latter for reuse;

passing a stream of said primary stage and products through a secondary concentration zone containing a second adsorption media, and adsorbing at least a portion of said end products on the second media;

thereafter passing a second eluant through the second media for desorbing at least a portion of the end products adsorbed thereon and producing a stream comprising secondary stage desorbed products and second eluant; and

treating said secondary stage desorbed products to produce a supply of final products more concentrated than said supply of primary stage end products.

29. A method of concentrating a dilute supply of furfural to provide a concentrated supply thereof, comprising the steps of:

directing said dilute supply of furfural to a primary concentration zone containing activated carbon,

adsorbing at least a fraction of said furfural onto said activated carbon;

desorbing said adsorbed furfural by conacting said primary zone activated carbon with methanol to produce a first supply of furfural in methanol;

treating said supply of furfural in a first fractional distillation zone in order to substantially separate the desorbed supply of furfural from the methanol and produce a primary stage supply thereof more concentrated than said dilute supply;

directing said primary stage supply of furfural to a secondary concentration zone containing activated carbon;

adsorbing at least a fraction of the primary stage supply of furfural to a secondary concentration zone containing activated carbon;

adsorbing at least a fraction of the primary stage supply of furfural directed to said secondary stage onto the activated carbon of the latter;

desorbing the furfural adsorbed in said secondary concen-

tration zone by contacting the activated carbon therewithin with methanol to produce a second supply of furfural in methanol;

concentrating said second supply of furfural in a second fractional distillation zone in order to produce a supply thereof more concentrated than said primary stage supply; and

recovering said supply of more concentrated furfural.

4,016,181
DYESTUFF PROCESS

Charles Hung Chang, Wyomissing Hills, Pa., assignor to GAF Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 405,307, Oct. 11, 1973, abandoned. This application Mar. 18, 1976, Ser. No. 668,049

Int. Cl.² C07C *87/64*

U.S. Cl. 260—380 **4 Claims**

1. In a process for preparing a 2-(haoaryl)-diamino-chrysazine the improvement which comprises, in a unitary reaction zone, the steps in combination:

1. reacting chrysazine with nitric acid in the presence of boric acid and sulfuric acid at a temperature between about 10° C. and about 50° C. to form 4,5-dinitrochrysazine in the reaction zone:
2. reacting said 4,5-dinitrochrysazine with an arylating agent selected from the group consisting of anisole, cresol, and methoxyphenol to form the corresponding 2-aryldinitrochrysazine at a temperature between 0° and 25° C. in said reaction zone;
3. contacting said 2aryl-dinitrochrysazine in said reaction zone with chlorine or bromine to halogenate said 2aryl moiety at a temperature between 0° and 40° C. in the presence of a catalytic amount of iodine or ferric chloride catalyst to produce the corresponding 2-(haloaryl)-dinitrochrysazine; and
4. subjecting the resultant 2-(haloaryl)-dinitrochrysazine to reducing conditions in said reaction zone in the presence of sulfuric acid at a temperature between 35° and 90° C to convert the nitro groups to amino groups and form the corresponding 2(haloaryl)-diaminochrysazine.

4,016,182
PROCESS FOR THE PRODUCTION OF AMINOANTHRAQUINONE COMPOUNDS

Paul Buecheler, Reinach, Basel-Land, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

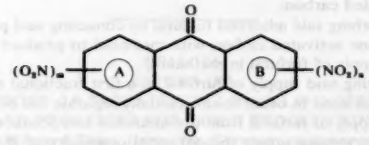
Filed May 22, 1974, Ser. No. 472,141

Claims priority, application Switzerland, May 28, 1973, 7639/73

Int. Cl.² C09B *1/22*

U.S. Cl. 260—371 **4 Claims**

1. In a process for the reduction of a nitroanthraquinone compound of formula I:



wherein

m is 0, 1 or 2,

n is 0, 1 or 2,

the sum of $m + n$ being 1, 2 or 3, and the rings A and B are either unsubstituted or further substituted in any position unoccupied by a nitro group by hydroxy, alkyl (C_1–C_6), hydroxyalkyl (C_1–C_6), alkoxy (C_1–C_4) alkyl (C_1–C_6), hydroxyalkoxy (C_1–C_4) alkyl (C_1–C_6), phenylalkyl (C_1–C_6), cycloalkyl (C_5–C_{12}), alkyl (C_1–C_6) cycloalkyl (C_5–C_{12}), alkoxy (C_1–C_4), hydroxyalkoxy (C_2–C_3), alkoxy (C_1–C_4) alkoxy (C_2–C_3), amino, monoalkyl (C_1–C_6) amino, dialkyl (C_1–C_6) amino, arylamino, cycloalkyl (C_5–C_{12}) amino, alkyl (C_1–C_6) cycloalkyl (C_5–C_{12}) amino, N-alkyl (C_1–C_6)-N-cycloalkyl (C_5–C_{12}) amino, N-alkyl (C_1–C_6) alkyl (C_1–C_6)-N-cycloalkyl-(C_5–C_{12}) amino, N-alkyl (C_1–C_6)-N-arylamino, aryl, alkyl (C_1–C_6) thio, sulpho, carboxy, sulphamoyl, carbamoyl, nitrile, halo, alkyl (C_1–C_6) carbonyl, arylcarbonyl or arylsulphonyl, wherein each aryl, aryl of arylamino, aryl of N-alkyl (C_1–C_6)-N-arylamino, aryl of arylcarbonyl and aryl of arylsulphonyl is, independently, selected from phenyl, diphenyl, substituted phenyl or diphenyl wherein the substituents of substituted phenyl or diphenyl are, independently, hydroxy, alkoxy (C_1–C_6), alkyl (C_1–C_6), halo, nitro, sulpho, carboxy, amino, monoalkyl (C_1–C_6) amino, carbamoyl and sulphamoyl, naphthyl and sulphosubstituted naphthyl,

to the corresponding amino-anthraquinone compound, the improvement consisting of reacting a compound of formula I with hydrazine in an aqueous medium, wherein the aqueous medium comprises from 50 to 100% by weight of water and wherein at least 10 mols of water are present in the aqueous medium per mol of the nitroanthraquinone compound.

4,016,183
BEAD WITH A PROJECTION

Alfred H. Wallach, c/o Walbead Inc., 38 W. 37th St., New York, N.Y. 10018

Filed Apr. 17, 1972, Ser. No. 244,412

Int. Cl.² B32B *9/04*

U.S. Cl. 428—542 **6 Claims**

1. A bead for use with a grid having thickness and spaced rows of receiving apertures spaced apart equal to the width of the bead comprising a bead body having having at least one bead hole therethrough and an external surface, at least one projection integral with the bead body and extending from the exterior surface thereof and at right angles to the bead hole, the bead body having a longitudinal dimension equal to the spacing between the rows of receiving apertures in the grid, and the projection having a length at least equal to the thickness of the grid, and a knob on the end of the projection having a dimension related solely to and being larger than the receiving aperture in the grid such that it yieldably resists insertion in a receiving aperture in the grid so as to be retained therein, the bead body having a width greater than the dimension of knob, and the material of the bead and the dimension of the projection at the bead body renders the projection readily breakable therefrom.

4,016,184
9-DEOXY-9,10-DIDEHYDRO-PGD, COMPOUNDS

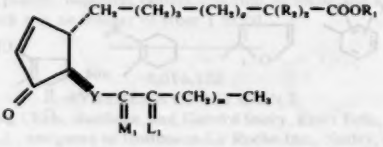
Douglas Ross Morton, Jr., Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Sept. 17, 1975, Ser. No. 614,242

Int. Cl.² C07C *177/00*

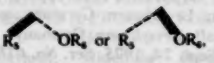
U.S. Cl. 260—408 **33 Claims**

1. A prostaglandin analog of the formula



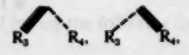
wherein R_2 is hydrogen or fluoro;

wherein Y is cis—CH=CH— or trans-CH=CH—; wherein *g* is one, 2, or 3 and *m* is one to 5, inclusive; wherein M_1 is

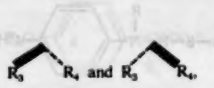


wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

wherein L_1 is



or a mixture of



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl or 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,016,185
PRODUCTION OF CARBOXYLIC ACIDS FROM PARAFFINS AND CARBON DIOXIDE

John B. Wilkes, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Dec. 11, 1975, Ser. No. 639,864
Int. Cl.² C07C *51/00, 51/15*
U.S. Cl. 260—413 **5 Claims**

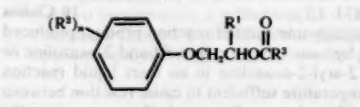
1. A process for preparing saturated carboxylic acids by vapor-phase cracking of high-molecular-weight paraffins, having a molecular weight of at least 168 and containing from about 12 to about 40 carbon atoms, in the presence of from about 0.5 to about 5.0 mols of carbon dioxide per mol of paraffin; wherein said cracking is carried out under conditions such that carbon dioxide is not an oxidizing agent; said conditions including a temperature of from about 500° C to about 700° C and a residence time of from about 0.1 seconds to about 10 seconds.

4,016,186
β-PHENOXY OR SUBSTITUTED PHENOXY ETHANOL COMPOUNDS

Kiyosi Kondo, Yamato; Osamu Terada; Kohei Oshima, both of Machida; Yasuki Mori, Kawasaki, and Kenichi Mochida, Hiratsuka, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd. and Sagami Chemical Research Center, both of Tokyo, Japan, part interest to each

Filed Nov. 26, 1974, Ser. No. 527,417
Int. Cl.² C07C *69/76*
U.S. Cl. 260—473 R **8 Claims**

1. A substituted β-phenoxy-ethanol ester expressed by the following formula:



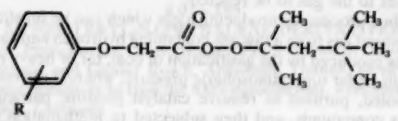
wherein R^1 is a hydrogen atom, straight-chain or branched-chain alkyl group having 1 – 6 carbon atoms, R^2 is a carboalkoxy group containing 1 to 6 carbon atoms in the alkyl moiety, R^3 is an alkyl group containing 1 to 12 carbon atom and n in a number from 1 to 3.

4,016,187
PHENOXY PERACETIC ACID ESTERS

Hendrik Harm Jannes Oosterwijk, Diepenveen, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.

Filed June 30, 1975, Ser. No. 592,080
Claims priority, application Netherlands, July 5, 1974, 7409110.
Int. Cl.² C07C *179/18*
U.S. Cl. 260—453 RZ **4 Claims**

1. Peresters having the general formula:



where R represents hydrogen or an alkyl group or an alkoxy group having 1–6 C-atoms.

4,016,188
PROCESS FOR THE PREPARATION OF LOW SILANES AND SILANE ESTERS

Hans-Joachim Kötzsch, Rheinfelden, and Hans-Joachim Vahlensieck, Wehr, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Continuation-in-part of Ser. No. 360,486, May 15, 1973, abandoned. This application Mar. 10, 1975, Ser. No. 556,994
Claims priority, application Germany, May 30, 1972, 2226265
Int. Cl.² C07F *7/18;* **C01B** *33/00, 33/20, 33/04*
U.S. Cl. 260—448.8 R **25 Claims**

1. In a process for preparing a compound of the formula $H_{x+1}Si(OR)_{4-x-1}$ or one of the formula $H_{x-1}Si(OR)_{4-x+1}$ wherein R is alkyl or alkoxyalkyl wherein the alkyl portion has up to 10 carbon atoms and x equals 1, 2 or 3 by reacting a compound of the formula $H_xSi(OR)_{4-x}$ in the presence of a catalyst under distillation conditions, distilling over and recovering a product of the formula $H_{x+1}Si(OR)_{4-x-1}$ or a product of the formula $H_{x-1}Si(OR)_{4-x+1}$, the improvement which comprises utilizing as the catalyst an oxide, halide, chloride, carbonate, acetate, ethylate or acetyl acetonate of zinc, cadmium, magnesium, calcium, strontium or barium, metallic zinc, metallic cadmium, metallic calcium, metallic magnesium, metallic strontium or metallic barium or metallic manganese or manganese chloride, manganese carbonate or zinc, aluminum or manganese acetylacetonate or an organic nitrogen compound selected from the group consisting of primary C_1–C_8 alkylamines, secondary C_1–C_8 alkylamines, tertiary C_1–C_8 alkylamines, substituted carboxylic acid amides of C_1–C_8 alkanoic acid amides, amides of phoshoric acid, pyridine, quinoline, isoquinoline and piperidine.

4,016,189
PROCESS FOR PRODUCING A GAS WHICH CAN BE SUBSTITUTED FOR NATURAL GAS

Wolf-Dieter Muller, Frankfurt am Main; Friedrich-Wilhelm Moller, Friedrichsdorf, and Heinz Jockel, Klein-Gerau, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 22, 1975, Ser. No. 598,085

Claims priority, application Germany, July 27, 1974, 2436297

Int. Cl.² C07C *1/04*

U.S. Cl. 260—449.6 M 5 Claims

1. In a process for producing a gas which can be substituted for natural gas from a raw gas containing hydrogen and carbon oxides produced by the gasification of coal, tar or heavy residual oils under superatmospheric pressure, wherein the raw gas is cooled, purified to remove catalyst poisons, particularly sulfur compounds, and then subjected to methanation in at least two stages in contact with nickel catalysts under pressures of 5–100 bars and at temperatures in the range of 200°–500° C, the improvement which comprises reacting the product gas from the preceding methanation stage in the last methanation stage in contact with a catalyst which is indirectly cooled by purified raw gas entering said last methanation stage at a temperature below 200° C and flowing therein countercurrent to the gas to be reacted.

5. In a process for producing a gas which can be substituted for natural gas from a raw gas containing hydrogen and carbon oxides produced by the gasification of coal, tar or heavy residual oils under superatmospheric pressure, wherein the raw gas is cooled, purified to remove catalyst poisons, particularly sulfur compounds, and then subjected to methanation in at least two stages in contact with nickel catalysts under pressures of 5–100 bars and at temperatures in the range of 200°–500° C, the improvement which comprises precooling the product gas from the methanation stage preceding the last methanation stage, said last methanation stage including a reaction zone with at least one catalyst zone and catalyst-free zones connected to said catalyst zone, feeding said precooled product gas into said catalyst-free zones of said reaction zone, said precooled gas flowing in the catalyst-free zones in countercurrent and with indirect heat exchange to the gas to be reacted in said catalyst zone, and feeding the gas from the catalyst-free zones into the catalyst zone to be reacted therein.

4,016,190
PROCESS FOR THE PREPARATION OF DIARYLCARBONATES

August Böckmann; Claus Wulff; Hugo Vernaleken; Wolfgang Alewelt, all of Krefeld, and Uwe Hucks, Alpen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Feb. 26, 1976, Ser. No. 661,528

Claims priority, application Germany, Mar. 1, 1975, 2509036

Int. Cl.² C07C *68/02*

U.S. Cl. 260—463 13 Claims

1. A process for preparing a symmetrical diarylcarbonate which comprises reacting phosgene and phenol in the phase interface process in a diphastic mixture of aqueous alkali metal hydroxide solution and a liquid diarylcarbonate in the presence of from 0.001 to 0.1 mol of a tertiary amine or a quaternary ammonium compound, per mol of phenol and at a temperature of up to 30° C. above the solidification point of the diarylcarbonate and at a pH of from 7 to 11.

4,016,191
STYRYL DYESTUFFS

Hermann Beecken, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

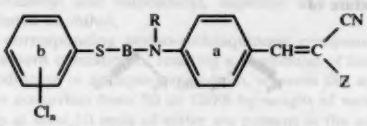
Filed Sept. 24, 1975, Ser. No. 616,262

Claims priority, application Germany, Sept. 24, 1974, 2445583

Int. Cl.² C07C *121/78*

U.S. Cl. 260—465 E 7 Claims

1. Water-insoluble styryl dyestuff of the formula



wherein

B is C_2-C_5-alkylene; C_2- to C_5-alkylene interrupted by an oxygen atom or sulphur; or the foregoing substituted by C_1- to C_4-alkoxy, C_1-C_4-alkenyloxy, benzyloxy or phenoxy;

R is H; C_1-C_4-alkyl; C_1-C_4-alkyl substituted by halogen, CN, COOH or C_1-C_4-alkoxy; cyclopentyl, cyclohexyl; benzyl; phenethyl; phenylpropyl; phenyl; naphthyl; or phenyl or naphthyl substituted by halogen, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkylmercapto, benzyl, cyclopentyl or cyclohexyl;

Z is CN, SO_2Y, COY, CO_2Y or $CONW_1W_2$;

Y is C_1-C_4-alkyl; C_1-C_4-alkyl substituted by halogen, CN, COOH or C_1-C_4-alkoxy; cyclopentyl; cyclohexyl; benzyl; phenethyl; phenylpropyl; phenyl; naphthyl; or phenyl or naphthyl substituted by halogen, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkylmercapto, benzyl, cyclopentyl or cyclohexyl;

W_1 and W_2 are H; methyl; ethyl; n-butyl; cyanoethyl; cyclohexyl; phenyl; chlorophenyl; 2-ethoxyphenyl; 4-t-butylphenyl; 4-cyclohexylphenyl; or -naphthyl;

n is 5; and wherein the ring *a* is unsubstituted or substituted by halogen, C_1- to C_3-alkyl, C_1 to C_3-alkoxy, C_2 to C_5-alkanoyloxy, C_2- to C_5-alkanoylamino, benzoyloxy, benzoyl-amino or phenoxy.

4,016,192
UNSATURATED ACRYLIC ACID-OXAZOLINE REACTION PRODUCTS

Donald A. Tomalia; Bruce P. Thill, and Thomas W. Regulski, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 30, 1974, Ser. No. 537,215

Int. Cl.² C07C *101/00*

U.S. Cl. 260—471 A 10 Claims

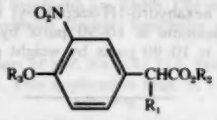
1. An ethylenically-unsaturated reaction product produced by (a) reacting by contacting acrylic acid and 2-oxazoline or a 2-alkyl or a 2-aryl-2-oxazoline in an inert liquid reaction medium at a temperature sufficient to cause reaction between said acrylic acid and oxazoline, and (b) recovering the ethylenically-unsaturated reaction product.

4,016,193
NOVEL SUBSTITUTED PHENYLACETIC ACID DERIVATIVES AND A PROCESS FOR PREPARING THEREOF

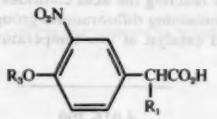
Toshihiko Kobayashi; Hidetoshi Hiranuma; Susumu Mizogami; Hiroyoshi Nishi; Mamoru Higuchi, and Masatoshi Onoya, all of Ami, Japan, assignors to Mitsubishi Yuka Pharmaceutical Co., Ltd., Tokyo, Japan

Filed July 3, 1975, Ser. No. 592,946
Claims priority, application Japan, July 9, 1974, 49-78606
Int. Cl.² C07C *79/46*
U.S. Cl. 260—471 R **9 Claims**

1. A compound having the following formula:



wherein R_1 represents a hydrogen atom or lower alkyl radical having 1-4 carbon atoms, R_2 represents an alkyl, phenyl, alkyl phenyl wherein the alkyl has from 1 to 4 carbon atoms, halogen-substituted phenyl wherein the halogen is chlorine or bromine, or alkoxy-substituted phenyl wherein the alkoxy is methoxy or ethoxy, and R_3 represents an alkenyl or alkynyl radical, both of which have 3–4 carbon atoms,
and having the following formula:



wherein R_1 and R_3 have the same meaning as above,
or a pharmaceutically acceptable salt thereof.

4,016,194
PREPARATIVE PROCESS FOR PREPARING PHENYLENEDIACETATE DIESTERS

John F. Knifton, Poughquag, and Robert M. Suggitt, Wappingers Falls, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Sept. 24, 1975, Ser. No. 616,227
Int. Cl.² C07C *69/76*
U.S. Cl. 260—475 SC **12 Claims**

1. A process for converting α,α'-dihaloxylene substrates selected from the group consisting of α,α'-dichloro-p-xylene, α,α'-dichloro-O-xylene, α,α'-dichloro-m-xylene, α,α'-dibromo-p-xylene, α,α'-dibromo-O-xylene, α,α'-dibromo-m-xylene, α,α'-diiodo-p-xylene, α,α'-diido-o-xylene, α,α'-diido-m-xylene, 3,6-bis(chloromethyl) durene, 3,4-bis(chloromethyl)-cyclohexylbenzene, 3,4-bis(chloromethyl)anisole, 3,4-bis(chloromethyl)toluene, 3,5-bis(chloromethyl)chlorobenzene, 3,5-bis(chloromethyl) acetophenone, 3,6-bis(chloromethyl)acetophenone, 3,5-bis(chloromethyl)benzonitrile, and mixtures of each of these thereof, to dialkyl phenylenediacetate esters in good yields and conversions by a process of:

a. admixing each mole of said α,α'-dihaloxylene substrate to be converted to said phenylenediacetate ester with at least a catalytic amount of a homogeneous ligand-stabilized palladium(II) or nickel(II) halide catalyst consisting of two components, a palladium(II) or nickel(II) halide salt and a Group VB or VIB stabilizing ligand, said 2-component catalyst being selected from the group consisting of:

-continued

$PdCl_2[P(p\text{-}CH_3 \cdot C_6H_4)_3]_2$	$PdCl_2[P(p\text{-}CH_3OC_6H_4)_3]_2$
$PdCl_2[P(p\text{-}Cl \cdot C_6H_4)_3]_2$	
$PdCl_2[(C_6H_5)_2P(CH_2)_2P(C_6H_5)_2]$	
$PdCl_2[P(C_6H_5)_3]_2$	$NiCl_2[P(p\text{-}CH_3C_6H_4)_3]_2$
$PdCl_2[S(C_6H_5)_2]_2$	$NiCl_2[As(C_6H_5)_3]_2$
$PdCl_2[C_6H_5CN]_2$	$NiBr_2[P(C_6H_5)_3]_2$
$NiCl_2[P(C_6H_5)_3]_2$	$PdBr_2[P(C_6H_5)_3]_2$
$PdCl_2[As(C_6H_5)_3]_2$	
$PdCl_2[P(OC_6H_5)_3]_2$	$PdCl_2[C_{12}H_8N_2]$

and at least two molar equivalents of an alcohol coreactant containing from 1 to 8 carbon atoms, to form a reaction mixture,

b. pressurizing said reaction mixture to superatmospheric pressures ranging from about 50 to 4000 psig with more than a sufficient amount of carbon monoxide to satisfy the stoichiometry of the diester reaction;

c. heating said pressurized reaction mixture from 20° to about 120° C until conversion of the α,α'-dihalides of xylene to said dialkyl phenylenediacetate takes place, and

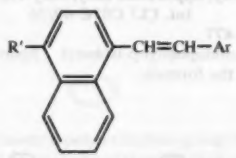
d. isolating said phenyldiacetates contained therein.

4,016,195
MONOSTYRYL-NAPHTHALENE DERIVATIVES

Ulrich Pintschovius, Hattersheim; Erich Schinzel, Hofheim, Taunus, and Günter Rosch, Altenhain, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Division of Ser. No. 453,848, March 22, 1974, Pat. No. 3,957,846, which is a division of Ser. No. 206,175, Dec. 8, 1971, Pat. No. 3,822,305. This application Feb. 13, 1976, Ser. No. 657,729
Claims priority, application Germany, Dec. 8, 1970, 2060228
Int. Cl.² C07C *63/60, 69/76*
U.S. Cl. 260—475 FR **5 Claims**

1. A compound of the formula



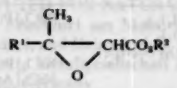
wherein R' is carboxy, lower carboalkoxy or lower carboalkoxy substituted by lower dialkylamino or lower trialkylammonium and Ar is phenyl substituted by carboxy or lower carboalkoxy.

4,016,196
BUTENOIC AND PYRUVIC ACID DERIVATIVES

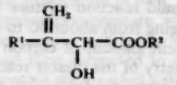
Katsura Kogure, Kawagoe; Noriyoshi Sueda, Tokyo; Sizuo Himoto, Kawagoe; Youziro Yoshino, Tokyo, and Kunio Nakagawa, Kawagoe, all of Japan, assignors to Nisshin Flour Milling Co., Ltd., Tokyo, Japan

Filed July 28, 1975, Ser. No. 599,775
Claims priority, application Japan, July 27, 1974, 49-85622; July 29, 1974, 49-86001
Int. Cl.² C07C *69/76*
U.S. Cl. 260—476 R **9 Claims**

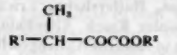
1. A process for preparing a 2-hydroxy butenoic acid or a pyruvic acid derivative comprising steps selected from the group consisting of (a) heating a glycidic ester derivative having the general formula,



wherein R^1 is a radical selected from the group consisting of aliphatic, alicyclic and aromatic radicals and R^2 is a lower alkyl group, and obtaining a 2-hydroxy butenoic acid derivative of the general formula,



werein R^1 and R^2 are as defined above, and (b) heating in the presence of an electrophilic reagent a compound selected from the group consisting of said glycidic ester derivatives and said 2-hydroxy butenoic acid derivatives and said 2-hydroxy butenoic acid derivatives and obtaining a pyruvic acid derivative of the general formula,



wherein R^1 and R^2 are as defined above.

4,016,197

4-ACETAMIDOPHENYL-p-ISOBUTYL HYDRATROPATE

Leandro Baiocchi, Rome, Italy, assignor to Aziende Chimiche Riunite Angelini Francesco A.C.R.A.F. S.p.A., Italy

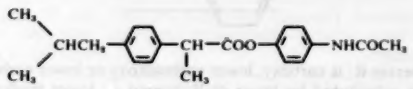
Filed May 1, 1975, Ser. No. 573,410

Claims priority, application Italy, May 15, 1974, 51002/74

Int. Cl.² C07C *69/76*

U.S. Cl. 260—477 **1 Claim**

1. 4-acetamidophenyl-p-isobutyl hydrotropate (m.p. 89°–90° C) of the formula:



4,016,198

STABILIZATION OF UNSATURATED CARBOXYLIC ACID ESTERS WITH MIXTURES OF POLYALKYLENE-AMINES AND ARYLENEDIAMINES

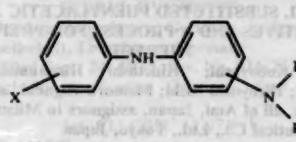
Gene R. Wilder, Medina, Ohio, assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 436,438, Jan. 25, 1974, abandoned. This application Jan. 2, 1976, Ser. No. 646,280

Int. Cl.² C07C *69/54*

U.S. Cl. 260—486 R **16 Claims**

1. A monomer composition comprising unsaturated carboxylic acid ester and, in amount effective to inhibit polymerization of the ester, and inhibitor mixture consisting essentially of polyalkyleneamine which in an acyclic aliphatic compound having amino groups attached through alkylene of 1–10 carbon atoms and arylenediamine of the formula



in which X is hydrogen, chloro, trichloromethyl, trifluoromethyl, nitro, lower alkyl, lower alkoxy, or phenoxy, R is hydrogen or alkyl, R_1 is alkyl or phenyl, or R and R_1 together with the nitrogen atom is a heterocyclic radical selected from the group consisting of pyrrolidinyl, 2,5-dimethylpyrrolidinyl, piperidino and hexahydro-1H-azepin-1-yl in which mixture the polyalkyleneamine is 10–90 parts by weight and the arylenediamine is 10–90 parts by weight per 100 parts by weight mixture.

4,016,199

COMPOUNDS CONTAINING NITROGEN AND FLUORINE

Royland D. Shoults, Arab, and Robert S. Yost, Huntsville, both of Ala., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Apr. 2, 1963, Ser. No. 270,110

Int. Cl.² C07C *69/54*, *93/33*

U.S. Cl. 260—486 H **7 Claims**

1. Processes for the preparation of esters of acrylic and alkacrylic acids with carbinols containing difluoramino groups which comprise reacting the acid chlorides of said acids with the carbinols containing difluoramino groups in the presence of a Lewis acid catalyst at low temperatures and under reduced pressure.

4,016,200

PROCESS FOR PREPARING CARBOXYLIC ACID ESTERS FROM TOLUENE AND XYLENE

Takeru Onoda; Keisuke Wada, both of Yokohama, and Masayuki Otake, Tokyo, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Division of Ser. No. 556,265, March 7, 1975, Pat. No. 3,959,352. This application Feb. 17, 1976, Ser. No. 658,766

Int. Cl.² C07C *67/05*

U.S. Cl. 260—488 CD **10 Claims**

1. In a process for preparing a carboxylic ester by reacting a hydrocarbon selected from the group consisting of toluene and xylene with an alkanoic carboxylic acid having 2 to 4 carbon atoms and molecular oxygen in the vapor phase in the presence of a supported solid catalyst of palladium metal, antimony oxide and a carboxylic acid salt of an alkali metal, an alkaline earth metal, zinc, cadmium, lead or tin, the improvement comprising: adding said antimony oxide to the support of said catalyst by dipping a carrier into an aqueous solution of a water soluble antimony compound selected from the group consisting of antimonic acid, antimonates and antimony complexes of oxalic, glycolic or tartaric acids; and calcining said dipped carrier at a temperature of from 500° – 900° C.

4,016,201

PROCESS FOR THE PREPARATION OF ACETOXYBUTANOLS

Christian Rasp, Cologne, and Johann Grolig, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 18, 1975, Ser. No. 588,077

Claims priority, application Germany, June 22, 1974, 2430038

Int. Cl.² C07C *67/28*

U.S. Cl. 260—491 **3 Claims**

1. In the process for the preparation of an acetoxybutanol

by hydrogenation of the corresponding acetoxybutyraldehyde in the presence of a metal of group VIII of the periodic table, wherein the acetoxybutyaldehyde is at least one of 4-acetoxybutyraldehyde, 2-acetoxybutyraldehyde, and 3-acetoxy-2-methylpropionaldehyde, the improvement which comprises carrying out the hydrogenation in the presence of methanol in an amount of 1 to 50% by weight, relative to acetoxybutyraldehyde employed.

4,016,202
1-PHENOXY-2-HYDROXY-3-ALKYNYLAMINO-PROPANES AND SALTS THEREOF

Herbert Köppe; Werner Kummer; Helmut Stähle, and Gojko Muacevic, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

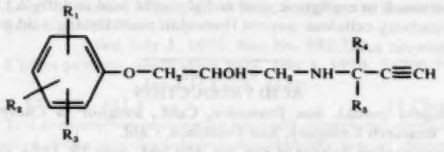
Continuation-in-part of Ser. No. 444,713, Feb. 22, 1974, Pat. No. 3,925,446. This application Sept. 3, 1975, Ser. No. 609,998

Claims priority, application Germany, Feb. 28, 1973, 2309887; Jan. 26, 1974, 2403809

Int. Cl.² C07C *93/06*

U.S. Cl. 260—501.17 **15 Claims**

1. A 1-aryloxy-2-hydroxy-3-alkynylamino-propane selected from the group consisting of racemic or optically active compounds of the formula



wherein

R_1 is a member selected from the group consisting of hydrogen; halogen; nitro; alkyl having from 1 to 5 carbon atoms; alkoxy having from 1 to 4 carbon atoms; alkenyl having from 2 to 5 carbon atoms; alkynyl having from 2 to 5 carbon atoms; alkylamino having from 1 to 5 carbon atoms; dialkylamino having from 1 to 5 carbon atoms in each alkyl; alkoxyalkyl having from 2 to 6 carbon atoms; alkylaminoalkyl having from 2 to 6 carbon atoms; dialkylaminoalkyl having from 3 to 12 carbon atoms; $-(CH_2)_x-NH_2$ or $-(CH_2)_x-OH$, where x is an integer from 0 to 3; alkynyloxy having from 3 to 6 carbon atoms; alkenyloxy having from 3 to 6 carbon atoms; $-CO-R_9$, where R_9 is a member selected from the group consisting of alkyl having 1 to 6 carbon atoms, phenylalkyl having 7 to 10 carbon atoms and phenyl; cycloalkyl having from 3 to 7 carbon atoms; phenyl; phenyl substituted with a substituent selected from the group consisting of halogen, lower alkyl, lower alkoxy and nitro; phenoxy; and phenoxy substituted with a substituent selected from the group consisting of halogen, lower alkyl, lower alkoxy and nitro;

R_2 is a member selected from the group consisting of hydrogen, halogen, alkyl having from 1 to 4 carbon atoms, alkoxy having from 1 to 4 carbon atoms, alkanoyl having from 2 to 4 carbon atoms, alkenyl having from 2 to 4 carbon atoms, amino and nitro;

R_3 is a member selected from the group consisting of hydrogen, halogen, alkyl having from 1 to 4 carbon atoms, alkoxy having from 1 to 4 carbon atoms and, together with R_2 in the ortho-position, $-CH=CH-CH=CH-$ or $-(CH_2)_n-$, where n is an integer from 3 to 5;

R_4 is a member selected from the group consisting of hydrogen and alkyl having from 1 to 3 carbon atoms; and

R_5 is a member selected from the group consisting of alkyl having from 1 to 3 carbon atoms, and, together with R_4, $-(CH_2)_p-$, where p is an integer from 4 to 6;

and physiologically compatible acid addition salts thereof.

4,016,203
PROCESS FOR THE MANUFACTURE OF COMPOUNDS CONTAINING VINYL GROUPS

Hermann Rempfler, Binningen; Hans Bosshard, and Kurt Weber, both of Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed June 27, 1973, Ser. No. 374,142

Claims priority, application Switzerland, June 30, 1972, 9852/72

Int. Cl.² C07C *143/24*

U.S. Cl. 260—505 R **11 Claims**

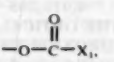
1. In a process for the manufacture of compounds of the formula

$$A - CH = CH - D - CH = CH - A_1 \qquad (I)$$

wherein A and A_1 independently of one another denote phenyl, naphthyl, diphenylyl, 2-phenyl-1,2,3-triazol-4-yl or pyridyl, it being possible for A and A_1 to contain non-chromophoric substituents, and D denotes the 4,4'-diphenylylene radical, 1,5- or 2,6-naphthylene radical or a 9,10-dihydrophenanthrene or dibenzofurane radical which is bonded to the ethylene groups in the 2,7-position, characterised in that in a first stage a compound of the formula

$$X - CH_2 - D - CH_2 - X \qquad (II)$$

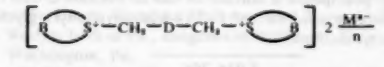
wherein X denotes a halogen atom, especially chlorine or bromine, the hydroxyl group or a group



wherein X_1 represents an aliphatic, cycloaliphatic or aromatic hydrocarbon radical, especially an alkyl radical with 1 to 6 carbon atoms, or the phenyl radical and D has the indicated meaning, the improvement wherein the compound of formula (II) is reacted in a strongly acid medium at a temperature of about −20° C to 120° C, in a molar ratio of at least 1:2, with an organic sulphide containing 5 to 8 ring members, of the formula

(III)

wherein B represents a polymethylene group of 4 to 7 methylene groups and wherein one of these methylene groups can be replaced by a hetero-atom and wherein these methylene groups can also contain alkyl groups with 1 to 4 carbon atoms as substituents, to give a sulphonium salt of the formula



(IV)

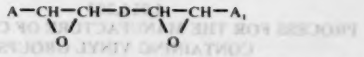
wherein M represents the anion of the strong acid used and n denotes the numbers 1 or 2; that, further, in a second stage the resulting sulphonium salt is mixed at temperatures below 20° C with 2 mols of an aldehyde of the formula

A-CHO (V)

or

A_1-CHO (VI)

of their mixture, in the presence of strong bases, in a strongly polar, protic or aprotic, water-miscible solvent then reacted at a temperature up to the boiling point of the solvent to give a diepoxide of the formula



and that the diepoxide of the formula (VII), thus obtained, is subjected, in a 3rd stage, to an expoxide reduction process at a temperature between 40° and 80° C with elimination of the epoxide oxygen and formation of ethylene groups.

4,016,204
METHOD OF SYNTHESIS OF TRANS-2-PHENYLCYCLOPROPYLAMINE

Vithal Jagannath Rajadhyaksha, Mission Viejo, Calif., assignor to Nelson Research & Development Company, Irvine, Calif.

Filed Oct. 31, 1975, Ser. No. 627,548
Int. Cl.² C07C *63/52*
U.S. Cl. 260—515 R **3 Claims**

1. In a method for the synthesis of trans-2-phenylcyclopropanecarboxylic acid, wherein styrene is reacted with ethyl diazoacetate to form the ester, cis,trans-ethyl-2-phenylcyclopropanecarboxylate, which ester is hydrolyzed to form the corresponding acid, cis,trans-2-phenylcyclopropanecarboxylic acid, from which the trans isomer, trans-2-phenylcyclopropanecarboxylic acid is obtained by repeated crystallizations, the improvement comprising first isomerizing said cis,-trans ester to form a reaction product containing about 95% trans ester by reacting said ester with an anhydrous alkali metal alkoxide in an anhydrous alcohol and hydrolyzing said reaction product to form the trans-2-phenylcyclopropanecarboxylic acid.

4,016,205
PROCESS FOR THE OPTICAL RESOLUTION OF DL-2-(4-HYDROXYPHENYL)GLYCINE

Kazuo Kariyone, Kyoto; Hideo Yagi, Toyonaka, and Kazuhiko Yoshida, Hirakata, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Sept. 12, 1975, Ser. No. 612,660
Claims priority, application Japan, Sept. 12, 1974, 49-105805
Int. Cl.² C07C *101/30*
U.S. Cl. 260—519 **24 Claims**

1. A process for the resolution of D-and L-2-(4-hydroxyphenyl)glycine which comprises treating DL-2-(4-hydroxyphenyl)glycine with d-3-bromo-2-oxo-10-bornanesulfonic acid to form a mixture of d-3-bromo-2-oxo-10-bornanesulfonic acid salts of D- and L-2-(4-hyroxyphenyl)glycine, treating the mixture with a solvent selected from the group consisting of a mixture of lower alkanol and chloroform or a mixture of lower alkanol and toluene to selectively precipitate a solvate of the d-3-bromo-2-oxo-10-bornanesulfonic acid salt of L-2-(4-hydroxyphenyl)glycine with chloroform or toluene.

16. A process for the resolution of D- and L-2-(4-hydroxyphenyl)glycine with comprises treating DL-2-(4-hydroxyphenyl)glycine with d-3-bromo-2-oxo-10-bornanesulfonic acid to form a mixture of d-3-bromo-2-oxo-10-bornanesulfonic acid salts of D- and L-2-(4-hydroxyphenyl) glycine, treating the mixture with an excess of isobutyl alcohol to selectively precipitate a solvate of the d-3-bromo-2-oxo-10-bornanesulfonic acid salt of L-2-(4-hydroxyphenyl) glycine with isobutyl alcohol.

4,016,206
PROCESS FOR PREPARING PYROMELLITIC ACID

Anatoli Onopchenko, Monroeville, and Johann G. D. Schulz, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Dec. 18, 1972, Ser. No. 316,422
Int. Cl. C07c *63/32*
U.S. Cl. 260—524 N **9 Claims**

1. In a process wherein durene is subjected to oxidation with nitric acid at a temperature of at least about 155° for about 0.1 to about 10 hours to convert said durene to pyromellitic acid, the improvement which comprises subjecting said durene to pretreatment with a gas containing molecular oxygen in a lower carboxylic acid having from two to four carbon atoms having dissolved therein a cobalt compound corresponding to about 0.1 to about 10 per cent by weight of cobalt, based on said lower carboxylic acid, said cobalt being the sole catalyst employed, the weight ratio of said lower carboxylic acid to durene being from about 1:10 to about 10:1, at a temperature of about 80° to about 140° C. for about 10 minutes to about 20 hours sufficient to convert substantially all of the durene to the corresponding diacids thereof and to small amounts of durylic acid and triacid.

4,016,207
HYDROLYZING DI- AND TRICARBOXY CELLULOSES WITH SULFUROUS ACID

William Montgomery Hearon, Portland, Oreg.; John F. Witte, and Cheng Fan Lo, both of Vancouver, Wash., assignors to Boise Cascade Corporation, Boise, Idaho

Filed Nov. 5, 1975, Ser. No. 628,887
Int. Cl.² C07C *51/00*
U.S. Cl. 260—528 **8 Claims**

1. The process which comprises: a. forming a suspension in aqueous sulfurous acid containing from 0.8% by weight to that amount required to saturate the aqueous suspension with sulfurous acid under the temperaturepressure conditions of the treating reaction of a carboxy cellulose-containing feedstock of the class consisting of 2,3-dicarboxy cellulose, 2,3,6-tricarboxy cellulose, and mixtures thereof and b. treating the carboxy cellulose feedstock with the aqueous sulfurous acid at a temperature of from 100° to 200° C. for a time predetermined to hydrolyze 2,3-dicarboxy cellulose content of the feedstock to erythronic acid and glyoxylic acid and the 2,3,6-tricarboxy cellulose content thereof to meso tartaric acid and glyoxylic acid.

4,016,208
ACID PRODUCTION

Shigeto Suzuki, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 480,894, June 19, 1974, Pat. No. 3,911,003. This application Apr. 29, 1975, Ser. No. 572,780
The portion of the term of this patent subsequent to Oct. 7, 1992, has been disclaimed.
Int. Cl.² C07C *59/06*
U.S. Cl. 260—535 R **7 Claims**

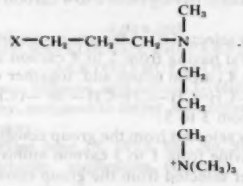
7. A process for producing hydroxyacetic acid which comprises contacting carbon monoxide with formaldehyde and a catalyst comprising HF and HBF_4 in a reaction zone and under conditions effective to form hydroxyacetic acid, including a temperature between 0° and 100° C and a carbon monoxide partial pressure between 10 and 4000 psig.

4,016,209
3-[N'-(3-HALOPROPYL)-N-'-METHYLAMINO]-N,N,N-TRIMETHYL-1-PROPANAMINIUM HALIDE AND ACID ADDITION SALTS THEREOF

Arthur F. Wagner, Princeton, and Tsung-Ying Shen, Westfield, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Apr. 23, 1975, Ser. No. 570,910
Int. Cl.² C07C *89/30*
U.S. Cl. 260—567.6 M **10 Claims**

1. A compound of the formula:



where X is chloro, bromo, or iodo, and y is chloride, bromide, iodide or a pharmaceutically acceptable anion were *a* is the anionic charge on Y, *m* is a number such that the product of *m* and *a* is 1, and hydroholic acid addition salts thereof.

4,016,210
CRYSTALLIZATION PROCESS

Patrick James Horner, Welwyn Garden City, England, and John Peter Brown, Westport, Conn., assignors to Imperial Chemical Industries Limited, London, England

Continuation-in-part of Ser. No. 566,511, April 8, 1975, abandoned. This application Oct. 23, 1975, Ser. No. 625,124

Claims priority, application United Kingdom, Apr. 16, 1974, 16448/74; Apr. 16, 1974, 16444/74

Int. Cl.² C07C *147/08*

U.S. Cl. 260—607 AR **8 Claims**

1. A process for the separation of bis-(4-chlorophenyl) sulphone from a crystallisation liquor comprising the reaction product obtained by reacting chlorobenzene sulphonic acid and chlorobenzene, comprising forming a crystallisation liquor, cooling the crystallisation liquor to a crystallisation temperature in the range 10° to 30° C so as to allow the bis-(4-chlorophenyl) sulphone to crystallise from the mother liquor, wherein the ratio of chlorobenzene to chlorobenzene sulphonic acid in the crystallisation liquor is such that the amount of crystallised bis-(4-chlorophenyl) sulphone is within 5 g. per 100 of the reaction product, of the maximum amount of crystallised bis-(4-chlorophenyl) sulphone obtainable at that crystallisation temperature by adjustment of the amount of chlorobenzene present.

4,016,211
STABILIZED POLYGLYCOL FOR HIGH TEMPERATURES

Silvano Fattori; Enzo Rossi, both of San Donato Milanese, and Luigi Imparato, Milan, all of Italy, assignors to Snam Progetti S.p.A., Milan, Italy

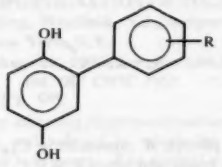
Filed July 3, 1975, Ser. No. 592,728

Claims priority, application Italy, July 4, 1974, 24790/74

Int. Cl.² C07C *43/00*

U.S. Cl. 260—611.5 **12 Claims**

1. A composition comprising a polyalkyleneglycol stabilized against molecular degradation and viscosity loss at elevated temperatures by about 0.1 to about 10% by weight of an arylhydroquinone having the following general formula:



wherein R is a member of the group consisting of hydrogen, alkyl, aryl, hydroxyl, substituted hydroxyl, amine, carboxyl, substituted carboxyl, nitro and halogen.

4,016,212
PROCESS FOR THE PREPARATION OF ALDEHYDES

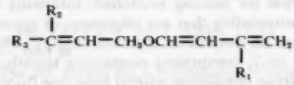
Willy Leimgruber, Montclair, and Donald Herman Valentine, Jr., Westfield, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 340,496, March 12, 1973, abandoned. This application Feb. 15, 1974, Ser. No. 442,991

Int. Cl.³ C07C *43/00*, *43/14*

U.S. Cl. 260—614 R **2 Claims**

1. A compound of the formula



wherein R_1 and R_2 are lower alkyl; R_3 is hydrogen or lower alkyl.

4,016,213
RECOVERY OF PHENOL, ACETONE AND DIMETHYL PHENYL CARBINOL FROM CUMENE OXIDATION PRODUCT

Chuen Y. Yeh, Morristown, and Francis L. Bohn, Morris Township, Morris County, both of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed May 3, 1971, Ser. No. 139,875

Int. Cl.² C07C *37/08*

U.S. Cl. 260—621 C **1 Claim**

1. In the process for obtaining phenol from cumene hydroperoxide, which has been obtained by liquid-phase oxidation of cumene with molecular oxygen, which involves forming a reaction mixture by continuously feeding the cumene oxidation product containing at least about 80 percent by weight of cumene hydroperoxide into a decomposer wherein the incoming hydroperoxide is diluted by cumene hydroperoxide decomposition products previously formed therein, maintaining the reaction mixture at elevated temperature, feeding to the reaction mixture a decomposition catalyst selected from the group consisting of sulfur dioxide and sulfuric acid, withdrawing reaction mixture from the decomposer, removing the decomposition catalyst from the product withdrawn from the decomposer, and fractionally distilling the resulting organic products to separately recover an acetone fraction, a phenol fraction and one or more by-product fractions, the improvement which comprises, in combination:

a. conducting the process in two decomposers through which the reaction mixture is passed serially, wherein the first decomposer is equipped with a agitator, and wherein the second decomposer is a tubular decomposer;

b. maintaining the reaction mixture in the decomposers at a temperature in the range of from 75° to 95° C.;

c. feeding the decomposition catalyst to the reaction mixture in the first decomposer in amount of from 0.002 to 0.02 percent by weight of the cumene hydroperoxide feed;

d. conducting the decomposition reaction in the absence of added water so that the reaction mixture does not contain more than about 0.3 percent by weight of water, based on the weight of the reaction mixture;

e. withdrawing reaction mixture from the first decomposer at cumene hydroperoxide concentration of between about 3 and about 6 percent by weight, based on the weight of the reaction mixture, and withdrawing reaction mixture from the second decomposer at cumene hydroperoxide concentrations not exceeding about 0.3 percent by weight, based on the weight of the reaction mixture; and

f. adding a base selected from the group consisting of alkali metal hydroxides and alkali metal phenates to the product withdrawn from the second decomposer in excess of amount required to neutralize the decomposition catalyst and sufficient to adjust the pH of the product to from 6 to 8; so that dehydration of dimethyl phenyl carbinol to form alpha-methylstyrene is substantially avoided during the decomposition and distillation steps.

4,016,214
PREPARATION OF ETHYNYLBENZENES

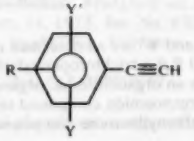
George Henry Douglas, Malvern, and Norman J. Santora, Roslyn, both of Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.

Division of Ser. No. 523,109, Nov. 12, 1974, Pat. No. 3,952,067. This application Sept. 23, 1975, Ser. No. 615,957

Int. Cl.² C07C *15/09*, *15/14*, *25/24*, *79/10*

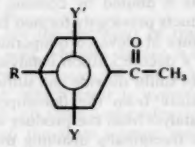
U.S. Cl. 260—649 F **9 Claims**

1. A process for preparing a substituted ethynylbenzene compound of the formula:

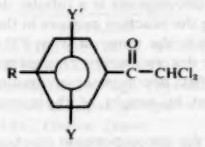


where:
R is
alkyl,
cycloalkyl,
alkylcycloalkyl,
aryl or
substituted aryl where the substituent is Y''; and
Y, Y' and Y'' are
hydrogen,
halo or
nitro
which comprises in sequence the steps of:

a. chlorinating a substituted acetophenone compound of the formula:

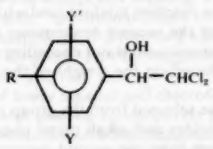


where R, Y and Y' are as described above, with elemental chlorine in the presence of iodine in an inert solvent to obtain a compound of the formula:



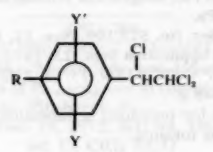
where R, Y, and Y' are as described above;

b. reducing said chlorinated product of step (a) with sodium borohydride to the corresponding benzyl alcohol of the formula:



where R, Y, and Y' are as described above;

c. halogenating said benzyl alcohol of step (b) with an agent selected from phosphorus trihalide, phosphorus pentahalide, phosphorus oxyhalide, sulfuryl halide, thionyl halide or sulfur halide to obtain a β,β,α-trichlorophenylethane compound of the formula:



where R, Y and Y' are as described above, and

d. reacting said β,β,α-trichlorophenylethane compounds of step (c) with an organolithium, organosodium, sodamide or lithium organoamide compound to obtain the desired substituted ethynylbenzene compound.

4,016,215

STABILIZATION OF 1,1,1-TRICHLOROETHANE

Susumu Otsuki; Kanichi Uchida, and Isao Miyanohara, all of Shin Nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 363,495, May 24, 1973, abandoned, which is a division of Ser. No. 169,112, Aug. 4, 1971, abandoned. This application Feb. 21, 1975, Ser. No. 551,646

Claims priority, application Japan, Aug. 21, 1970, 45-72813

Int. Cl.² C07C *17/42*

U.S. Cl. 260—652.5 R **7 Claims**

1. A stabilized 1,1,1-trichloroethane which is stabilized against decomposition initiated by contact with iron, which comprises:

the admixture of 1,1,1-trichloroethane and 0.001–10 volume percent of a stabilizer selected from the group consisting of styrene oxide, phenylglycidyl ether and mixtures thereof and a second stabilizer selected from the group consisting of a primary, secondary or tertiary alkanol, a 1–3 carbon atom aliphatic nitro compound, 1,4-dioxane or 1,3-dioxolane and mixtures thereof in amounts efficient to effectively stabilize said trichloroethane.

4,016,216

STABILIZING 2,3-DICHLORO-1,3-BUTADIENE WITH CERTAIN N-NITROSOANILINE COMPOUNDS

Akihiko Shimizu, and Takao Hayashi, both of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Japan

Continuation-in-part of Ser. No. 444,014, Feb. 20, 1974, abandoned. This application July 31, 1975, Ser. No. 600,565

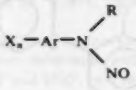
Claims priority, application Japan, Feb. 20, 1973, 48-19783

The portion of the term of this patent subsequent to Mar. 22, 1994, has been disclaimed.

Int. Cl.² C07C *17/42*

U.S. Cl. 260—652.5 P **7 Claims**

1. A composition comprising 2,3-dichloro-1,3-butadiene stabilized against polymerization with an effective amount of an aniline compound having an N-nitroso group and having the formula:



wherein Ar is phenyl; R represents a C_{1-4} alkyl group or a carboxymethyl group and when R is a C_{1-4} alkyl group, X is hydroxy and when R is carboxymethyl, X is a halogen or hydroxyl group and n is 1 or 2 to, whereby said N-nitrosoaniline is easily removed from said monomer by washing the same with an aqueous alkaline solution.

4,016,217

PREPARATION OF PERFLUOROOLEFINES

Harold Crosbie Fielding, Northwich, and Alfred John Rudge, Frodsham, both of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 41,164, May 25, 1970, abandoned, which is a continuation of Ser. No. 537,689, March 28, 1966. This application Apr. 25, 1975, Ser. No. 571,770

Claims priority, application United Kingdom, Apr. 8, 1965, 14992/65

Int. Cl.² C07C *17/26, 19/08*

U.S. Cl. 260—653.1 R **12 Claims**

1. A process for making branched, internally-unsaturated liquid perfluoroolefins that are oligomers of tetrafluoroethylene and have an empiricial formula $(C_2F_4)_n$ where n is an integer of 4 to 7, comprising contacting tetrafluoroethylene under anhydrous conditions with at least one fluoride which is a source of fluoride ions, said fluoride being selected from the group consisting of the normal fluorides, acid fluorides and fluorosulphinates of the metals potassium, rubidium and cae-

sium and normal fluorides of a tetraalkylammonium ion, at a temperature of 20° C to 170° C in the presence of an inert solvent selected from the group consisting of dimethylformamide, dimethyl sulphoxide, N-methyl pyrrolidone and hexamethylphosphoramide, and recovering said branched, internally-unsaturated liquid perfluoroolefins from the reaction medium.

4,016,218

ALKYLATION IN PRESENCE OF THERMALLY MODIFIED CRYSTALLINE ALUMINOSILICATE CATALYST

Werner O. Haag, Trenton, and David H. Olson, Pennington, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 29, 1975, Ser. No. 582,025
Int. Cl.² C07C *3/52*
U.S. Cl. 260—671 R **16 Claims**

1. A process for effecting alkylation of an aromatic hydrocarbon charge which comprises contacting said aromatic hydrocarbon charge with an olefinic hydrocarbon alkylating agent under conditions effective for accomplishing said alkylation including a reactor inlet temperature between about 575° F. and about 900° F., a reactor pressure between atmospheric and about 3000 psig, employing a mole ratio of hydrocarbon aromatic charge to olefinic hydrocarbon alkylating agent in the approximate range of 1:1 to 30:1 and a total weight hourly space velocity between about 2 and 2000 in the presence of a catalyst comprising a crystalline aluminosilicate zeolite, having more than 50 percent of the cationic sites thereof occupied by hydrogen ions, said zeolite having a silica to alumina ratio of at least about 12, a constraint index within the approximate range of 1 to 12, said catalyst having been modified by prior thermal treatment at about 1200° F. to about 1800° F. in an inert atmosphere or at about 500° F. to about 1800° F. in steam to reduce the alpha value thereof to less than about 250.

4,016,219

DISPROPORTIONATION OF TOLUENE

Warren W. Kaeding, Westfield, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 22, 1975, Ser. No. 606,810
Int. Cl.² C07C *3/62*
U.S. Cl. 260—672 T **13 Claims**

1. A process for effecting disproportionation of toluene to produce benzene and xylenes in which the proportion of para-xylene isomer is in excess of its normal equilibrium concentration which comprises contacting toluene under conditions effective for accomplishing said disproportionation in the presence of a catalyst comprising a crystalline aluminosilicate zeolite, said zeolite having a silica to alumina ratio of at least about 12, a constraint index within the approximate range of 1 to 12, said catalyst having been modified by the addition thereto of phosphorus in an amount of at least about 0.5 percent by weight.

4,016,220

PROCESS FOR THE PREPARATION OF 9-TRICOSENE AND 9-HENEICOSENE

Friedrich-Wilhelm Küpper, and Roland Streck, both of Marl, Germany, assignors to Chemische Werke Huels Aktiengesellschaft, Marl, Germany

Filed Feb. 12, 1976, Ser. No. 657,621
Claims priority, application Germany, Mar. 22, 1975, 2512741
Int. Cl.² C07C *3/62*; A01N *17/14*
U.S. Cl. 260—683 D **12 Claims**

1. A process for preparing a compound selected from the group consisting of 9-tricosene, 9-heneicosene and mixtures thereof, which comprises metathetically reacting:

a. an alkene of at least 10 carbon atoms having an n-nonylidene radical;

b. at least one member selected from the group consisting of an alkene of at least 13 carbon atoms having an n-dodecylidene radical and an alkene of at least 15 carbon atoms having a n-tetradecylidene radical; and

c. a catalytic amount of an olefin metathesis catalyst substantially free of oligomerization and isomerization activity with respect to said reactants, said catalyst comprising a compound of a metal in Group VB to VIIB of the Periodic Table

to form said 9-tricosene, 9-heneicosene or mixtures thereof.

4,016,221

IMPACT-RESISTANT RESIN COMPOSITION

Teizo Kudo; Yoshio Hashizume; Masanori Itoh; and Makoto Shiga, all of Ohimachi, Japan, assignors to Daicel Ltd., Osaka, Japan

Division of Ser. No. 513,541, Oct. 10, 1974, Pat. No. 3,954,903. This application Jan. 19, 1976, Ser. No. 650,319
Claims priority, application Japan, Oct. 13, 1973, 48-115194
Int. Cl.² C08L *67/06*
U.S. Cl. 260—873 **9 Claims**

1. An impact-resistant ABS resin composition capable of being molded by fusing particles of said resin composition under conditions of low shear, in which the resin components consist essentially of a mixture of

A. a graft copolymer obtained by polymerizing under bulk polymerization conditions, with stirring, a solution of a rubbery component selected from the group consisting of polybutadiene and butadiene-styrene copolymer, dissolved in a mixture of vinyl aromatic monomer and vinyl cyanide monomer, until from 10 to 40 percent of said monomers are polymerized and a dispersed rubber phase is formed; and then adding the reaction mixture to water containing a dispersing agent suspended therein and completing polymerization of said monomers, with stirring, under suspension polymerization conditions to obtain a graft copolymer in which said monomers are graft copolymerized onto particles of said rubbery component wherein the average particle size of said rubbery component in the graft copolymer is in the range of 0.5 to 2.0 microns

B. a straight chain saturated polyester of a cyclic lactone selected from the group consisting of ε-caprolactone, pivalolactone and laurolactone, said polyester having an average molecular weight of from 1,000 to 50,000, the amount of said polyester being in the range of from 1 to 10 parts by weight, per 100 parts by weight of said graft copolymer, said polyester being added during the bulk polymerization stage, during the suspension polymerization stage, or after polymerization is complete.

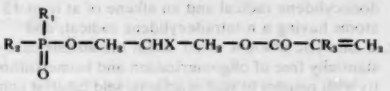
4,016,222

UNSATURATED PHOSPHORUS COMPOUNDS

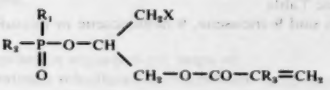
Walter Dursch, Konigstein, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 14, 1975, Ser. No. 622,264
Claims priority, application Germany, Oct. 19, 1974, 2449733
Int. Cl.² G07F *9/40*
U.S. Cl. 260—932 **3 Claims**

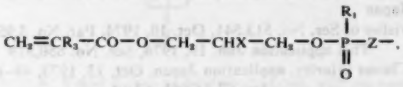
1. An unsaturated phosphorus compound of the formulae

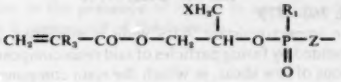


and



in which R_1 is a saturated or unsaturated aliphatic hydrocarbon radical of 1 to 8 carbons which may also carry chlorine, bromine, cyano, $-OR_4$, $-COOR_4$ or $-CON(R_4)_2$, R_2 has the same meaning as R_1 and additionally is a radical of one of the formulae





or

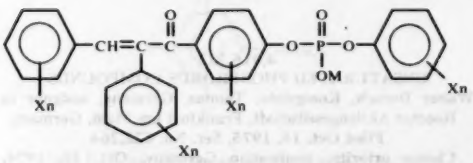
in which Z is a straight or branched ch. in alkylene of 1 to 8 carbons, phenylene or a xylylene which may carry chlorine, bromine or hydroxy, and Y is a straight or branched chain —O-alkyl of 2 to 8 carbons which may carry chlorine, bromine and/or hydroxy, or is a chlorine, bromine or hydroxy, R_3 is hydrogen or methyl, R_4 is hydrogen, alkyl of 1 to 8 carbons or alkenyl of 2 to 8 carbons which may carry chlorine, bromine or hydroxy, and X is chlorine, bromine or hydroxy.

4,016,223
PROSTAGLANDIN DEHYDROGENASE INHIBITING AGENTS

Vithal J. Rajadhyaksha, Mission Viejo, Calif.; Richard A. Schroer, West Nyack, N.Y.; Phillip J. Brock, Mountain View, and Earl R. Krueger, Anaheim, both of Calif., assignors to Nelson Research & Development Company, Irvine, Calif.

Filed Aug. 7, 1975, Ser. No. 602,735
Int. Cl.² C07F 9/09; A01N 9/36
U.S. Cl. 260—946 **2 Claims**

1. Compounds having the structural formula



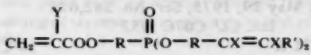
wherein M is H or a pharmaceutically acceptable salt; and X is selected from the group consisting of H, halogen, NO_2, lower alkyl and amino, and *n* is 0–5.

4,016,224
HALOGENATED ESTERS OF PHOSPHORUS-CONTAINING ACIDS

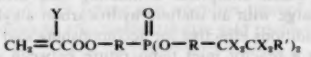
Gaetano F. D'Alelio, 2011 E. Cedar St., South Bend, Ind. 46617

Division of Ser. No. 524,666, Nov. 18, 1974, Pat. No. 3,950,457, which is a division of Ser. No. 383,583, July 30, 1973, Pat. No. 3,886,236, which is a continuation-in-part of Ser. No. 179,543, Sept. 10, 1971, Pat. No. 3,780,144, which is a continuation of Ser. No. 785,335, Dec. 19, 1968, abandoned. This application Jan. 5, 1976, Ser. No. 646,503
Int. Cl.² C07F 9/40
U.S. Cl. 260—952 **10 Claims**

1. A phosphorus-halogen-containing compound having a formula selected from the class consisting of



and



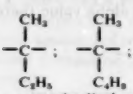
wherein

Y represents H, CH_3 or Cl;

X represents Cl or Br;

R′ represents H, X or R ″;

R represents a divalent hydrocarbon radical of up to 20 carbon atoms except that in the O—R—Q portion the R group represents $-CH(CH_3)-$; $-C(CH_3)_2-$; $-CH(C_4H_9)-$; $-C(C_4H_9)_2-$; $-CH(C_2H_5)-$; $-CH(C_3H_7-$; $-CH(C_8H_{17})-$; $-CH(C_6H_5)-$; $-CH_2CH(C_6H_4CH_3)-$; $-CH(C_6H_{11})-$; $-CH_2CH(CH=CH_2)-$;



arylene or cycloalkylene, in which arylene and cycloalkylene groups the P is connected directly to an aromatic or cycloaliphatic ring therein; and

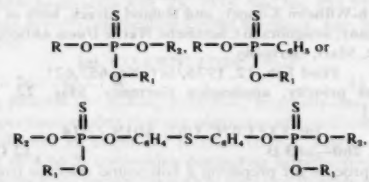
R″ represents a monovalent hydrocarbon radical of 1–20 carbon atoms.

4,016,225
PROCESS FOR PREPARING PHOSPHOROTHIOATES AND PHENYLPHOSPHONOTHIOATES

Lorraine M. Kroposki, Walnut Creek, Calif., and Masao Yoshimine, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 361,937, May 21, 1973, Pat. No. 3,907,815, which is a continuation-in-part of Ser. No. 187,139, Oct. 6, 1971, abandoned. This application July 31, 1975, Ser. No. 600,543
Int. Cl.² C07C 9/165, 9/40
U.S. Cl. 260—973 **15 Claims**

1. In the process of preparing a compound corresponding to the formula



wherein:

R_1 and R_2 are each independently lower alkyl; and R is

wherein:

n is O, 1, 2 or 3; and

X is nitro, cyano, halo, lower alkyl, lower alkoxy, lower alkylthio or lower alkylsulfinyl, with the proviso that R does not bear more than one nitro group, lower alkylthio group or lower alkylsulfinyl group;

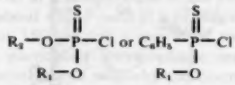
by reacting in an inert liquid reaction medium under neutral or alkaline conditions (a) a compound corresponding to the formula

$$R—O^-M^+$$

or

$$M^+O^-—C_6H_4—S—C_6H_4—O^-M^+$$

with (b) a compound corresponding to the formula



wherein M is an alkali metal and R, R_1 and R_2 have the aforesaid meaning;

the improvement consisting of conducting the process in the presence of a small but catalytic amount of (1) a quaternary ammonium salt having a minimum solubility of at least 1 weight percent in the liquid reaction medium at 25° C and (2) 1,4-diazabicyclo[2.2.2]octane.

4,016,226

METHOD OF MAKING POROUS NUCLEAR FUEL

Eugene Joseph Kosiancic, Richland, Wash., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Feb. 10, 1975, Ser. No. 548,460

Int. Cl.² G21C *21/02*

U.S. Cl. 264—.5 **2 Claims**

1. The method for producing a sintered ceramic pellet with a controlled porosity comprising the steps of blending ceramic nuclear fuel powder with a predetermined quantity of uranium dioxide gel spheres, pressing said blended ceramic nuclear fuel and gel spheres into a pellet, and sintering said pressed pellet to completely dissipate at least a portion of said gel spheres in order to prevent a residue deposit from forming within the pellet and to produce a selectively controlled porosity within said pellet.

4,016,227

PROCESS FOR THE ISOLATION OF POLYIMIDES IN A SOLID STATE

Gregory L. Lines, Cheshire, and Alec Odinak, New Haven, both of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Feb. 7, 1972, Ser. No. 224,311

Int. Cl.² B29C *23/00*; B29F *3/00*

U.S. Cl. 264—14 **5 Claims**

1. A process for the isolation of a polyimide in a solid, non-viscous state from a reaction mixture which has been obtained by reaction of 3,3'4,4'-benzophenone tetracarboxylic dianhydride with a substantially stoichiometric amount of a mixture of toluene diisocyanate and 4,4'-methylenebis(phenyl isocyanate) in the presence of a dipolar aprotic solvent, which process comprises passing said reaction mixture through shaping means to convert said polyimide to a shape in which the exposed surface area per unit volume is as high as possible passing said shaped polyimide into water, and allowing said shaped polyimide to remain in contact with said water until solidification of said polyimide is complete.

4,016,228

METHOD FOR PROGRESSIVELY CONSTRUCTING A WALL OF CEMENTITIOUS MATERIAL

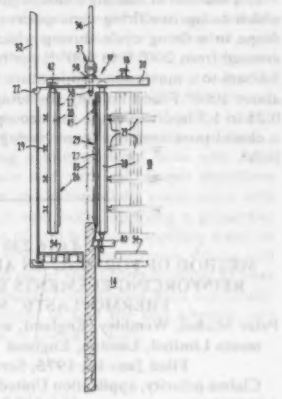
Hans Heinrich Schmidt, Doncaster, Australia, assignor to Enor Nominees Pty. Limited, Victoria, Australia

Division of Ser. No. 448,716, March 6, 1974, abandoned. This application Feb. 28, 1975, Ser. No. 554,235

Claims priority, application Australia, Mar. 7, 1973, 2511/73; Mar. 7, 1973, 2513/73

Int. Cl.² E04B *1/16*

U.S. Cl. 264—33 **11 Claims**



1. A method for progressively constructing a plurality of substantially vertical walls of hardened cementitious material in successive, vertically incremental castings, said method comprising:

I. providing a plurality of pairs of formwork sections in a first casting position, each pair comprising a substantially vertical frost formwork section and a facing substantially vertical second formwork section, at least on pair of formwork sections associated with each wall to be built, wherein said formwork sections define at least in part a cavity for an incremental casting which is to be made, while supporting said formwork sections by at least one retractable support from a completed incremental casting of first hardened cementitious material,

II. interlocking said first formwork sections and interlocking said second formwork sections, and therafter casting second hardenable cementitious material in said cavity and permitting same to harden,

III. thereafter disengaging said framework sections from the second hardened cementitious material, and moving each entire said first formwork sectio laterally and horizontally away from the second formwork section at least a distance to permit a person to pass between the first and second formwork sections,

IV. raising said plurality of pairs of formwork sections simultaneously from the first casting position to a vertically higher second casting position by raising a common, rigid support structure, from which all of said formwork sections are suspended, from a first support position to a second vertically higher support position while

A. supporting said common support structure on said second hardened cementitious material,

B. disengaging said retractable support from supporting contact with said hardened cementitious material,

C. interlocking said second formwork sections in a structurally rigid and stable assembly, and

D. guiding said interlocked second formwork sections by contact with at least one hardened incremental wall section of cementitious material, to maintain alignment of and to stablize said second formwork sections, and

V. repeating the above steps until the desired wall height has been achieved.

4,016,229

CLOSED-CELL CERAMIC FOAM MATERIAL

Albert G. Tobin, Smithtown, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Nov. 19, 1973, Ser. No. 417,361

Int. Cl.² C04B *33/32, 35/64, 35/81*

U.S. Cl. 264—63 **14 Claims**

1. A method of making a closed-pore ceramic foam material which comprises firing cenospheres having a predetermined shape in a firing cycle during which the temperature is increased from 200° F to 600° F per hour over a period of 6 to 8 hours to a maximum temperature of from about 2470° F to about 3000° F and holding the temperature at that level for 0.25 to 1.5 hours to cause the cenospheres to shrink and form a closed-pore ceramic foam having a density of at least 31 lb/ft³.

4,016,230

METHOD OF FORMING AN ARTICLE INCLUDING REINFORCING ELEMENTS ENCAPSULATED IN THERMOPLASTIC MATERIAL

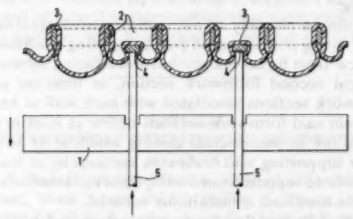
Peter Michel, Wembley, England, assignor to Brigend Investments Limited, London, England

Filed Jan. 14, 1975, Ser. No. 540,769

Claims priority, application United Kingdom, Apr. 29, 1974, 18768/74

Int. Cl.² B29C *17/04;* **B29D** *3/02*

U.S. Cl. 264—89 **5 Claims**



1. A method of forming a substantially two dimensional array of reinforcement elements completely encapsulated in a thermoplastic material, comprising the steps of: supporting said reinforcement array above a vacuum forming table on a first section of said table movable upwards from a remaining second section of said table, said first section extending completely across said table, positioning a sheet of hot thermoplastic material over said reinforcement array, applying a vacuum through said remaining second section of said table to draw said thermoplastic material down and around underneath said reinforcement above said second section of said table, retracting said first section to a position substantially flush with said second section once said thermoplastic material is capable of supporting said reinforcement above said second section, whereby said reinforcement is supported above said first and second sections by said thermoplastic material which is in contact with said second section, and then applying a vacuum through said first section to draw said thermoplastic material around and underneath said reinforcement above said first section of said table.

4,016,231

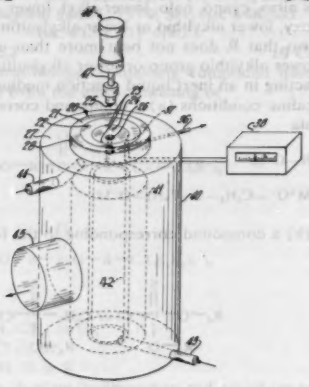
METHOD FOR MOLDING ARTICLES OF THERMOPLASTIC SHEET MATERIALS

Carl J. Hawkins, Toledo, Ohio, assignor to Rowe Industries Division of Coleman Cable & Wire Company, Toledo, Ohio

Continuation of Ser. No. 497,886, Aug. 16, 1974, abandoned, which is a division of Ser. No. 268,879, July 3, 1972, Pat. No. 3,830,616. This application Oct. 22, 1975, Ser. No. 624,702

Int. Cl.² B29C *17/04*

U.S. Cl. 264—92 **5 Claims**



1. A method of molding thermo-formable sheet material into three dimensional articles comprising;

placing a planar sheet of the thermo-formable sheet material in heat transfer relation over the cavity surface of a relatively thin mold of substantially uniform thickness having an exposed underside and conforming in shape to the article to be formed, flowing a heated fluid from directly under the mold into communication with the exposed underside of said mold opposite said cavity surface to convection heat said mold to a preselected temperature uniformly throughout, transmitting heat from said mold to said overlying sheet material,

drawing said heated sheet material into communication with the heated cavity surface of said uniform thickness mold,

retaining said drawn sheet material in communication with said mold surface and continuing to supply heat to said mold and to said drawn sheet for a preselected dwell period for establishment of a predeterminable high temperature dimensionally stable condition of said formed article, and

then forcefully cooling said mold and sheet material uniformly and withdrawing the shaped article from said mold cavity.

4,016,232

PROCESS OF MAKING LAMINATED STRUCTURAL MEMBER

John Philip Pringle, Allen, Tex., assignor to Capital Wire and Cable, Division of U.S. Industries, Plano, Tex.

Continuation-in-part of Ser. No. 466,242, May 2, 1974, Pat. No. 3,956,541. This application Feb. 10, 1975, Ser. No. 548,731

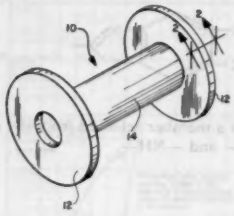
Int. Cl.² B29J *5/00*

U.S. Cl. 264—112 **7 Claims**

1. A process for forming a flexible laminated structural member comprising:

a. admixing from about 30 to about 60 weight percent of particulate thermoplastic material wherein at least 50 percent of the particles have a particle dimension of from about 1/16 inch to about ¼ inch with from aout 70 to about 40 weight percent of a particulate wood filler material to form a first mixture;

b. admixing from about 11 to about 18 weight percent of a thermosetting binder, based upon the weight of the first mixture, to the first mixture to form a resultant mixture;
c. placing a sheet material having at least one surface into a mold;
d. placing an effective amount of the resultant mixture into the mold adjacent to at least one of the surfaces of the sheet material to cover the surface to a desired depth; and



e. heating and compressing the resultant mixture and the sheet material at a temperature in the range from about 250° F. to about 450° F. and at a pressure from about 75 psi to about 350 psi for a period of time effective to enable the particulate thermoplastic material to form flexible discrete zones whereby the discrete zones bond together and said resulant mixture bonds to said sheet material to form a flexible laminated structural member.

4,016,233

PROCESS OF MAKING A FLEXIBLE STRUCTURAL MEMBER

John Philip Pringle, Allen, Tex., assignor to Capital Wire and Cable, Division of U.S. Industries, Plano, Tex.

Division of Ser. No. 466,242, May 2, 1974, Pat. No. 3,956,541. This application Mar. 10, 1975, Ser. No. 557,045
Int. Cl.² B29J *5/02*
U.S. Cl. 264—122 **6 Claims**

1. A process for forming a flexible structural member comprising:
a. admixing from about 30 to about 60 weight percent of particulate thermoplastic material wherein at least 50 percent of the particles have a particle dimension of from about 1/16 inch to about ¼ inch with from about 70 to about 40 weight percent of a particulate wood filler material to form a first mixture;
b. admixing from about 11 to about 18 weight percent of a thermosetting binder, based on the weight of the first mixture, to the first mixture to form a resultant mixture;
c. placing the resulting mixture into a mold; and
d. heating and compressing the resultant mixture at a temperature in a range from 250° F to about 450° F and at a pressure from about 75 psi to about 350 psi for a period of time effective to enable the particulate thermoplastic material to form flexible discrete zones whereby the flexible discrete zones bond together and to the particulate wood filler material and a flexible structural member is formed.

4,016,234

PAPER-BACKED ACOUSTICAL TILE

Herbert L. Warren, Arlington Heights, and Bruce A. Wittrup, Hoffman Estates, both of Ill., assignors to United States Gypsum Company, Chicago, Ill.

Division of Ser. No. 471,392, May 20, 1974. This application June 20, 1975, Ser. No. 588,924
Int. Cl.² E04B *1/74*
U.S. Cl. 264—129 **4 Claims**

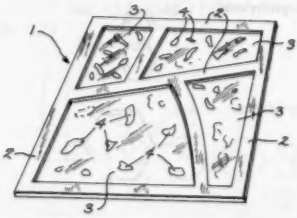
1. A method for forming an acoustical tile, which comprises forming an aqueous slurry of mineral wool fibers and a binder, depositing the slurry on a paper sheet-form member, said paper sheet-form member being water absorbent, having good sound attenuation properties, and having a non-water-leachable fire-retardant material associated therewith in an amount sufficient to render said paper sheet-form member fire-retardant, drying said slurry and said sheet-form member to form a laminated structure having a mineral wool body with back surface and a face surface and with said paper sheetform member uniformly affixed and substantially coextensive with the entire back surface of said body, applying a protective coating on the face surface of said body and applying water on the paper sheet-form member, and concurrently drying said protective coating and said paper sheet-form member to form a coated acoustical tile wherein said mineral wool constitutes a major proportion by weight of said tile and wherein said coated face surface is free of concave warp.

4,016,235

METHOD OF MAKING SIMULATED STAINED GLASS FROM MOLDABLE PLASTIC MATERIAL

William P. Ferro, Bayside, Wis., assignor to KCS Industries, Inc., Milwaukee, Wis.

Filed Dec. 23, 1974, Ser. No. 536,921
Int. Cl.² B29C *9/00*; **B29D** *17/04*, *9/00*
U.S. Cl. 264—132 **8 Claims**



1. A process for forming a simulated stained glass article, comprising the steps of providing an injection molding die having a die cavity bordered by a die member, forming a series of interconnected recesses in a surface of the die member with said recesses bordering isolated areas of said surface, forming a series of randomly disposed surface indentations in said isolated areas, coating a series of colored interconnected strips on a surface of a thin plastic sheet with said strips having the same configuration as said recesses, said strips bordering colored isolated zones having the same configuration as said areas and having a different color than said strips, positioning said sheet on said surface of the die member and registering said strips with said recesses and registering said zones with said areas, holding the sheet against the die member, injecting under pressure into said cavity a heated liquid resin compatible with said sheet, said sheet softening and deforming under

said heat and pressure to deform the strips into the corresponding recesses and to deform said zones into the surface indentations of the corresponding areas, and fusing the resin to said sheet to provide a simulated stained glass article having raised colored strips bordering different colored areas.

4,016,236

PROCESS FOR MANUFACTURING AROMATIC POLYMER FIBERS

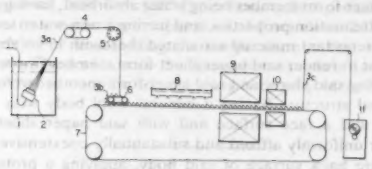
Keisaku Nagasawa; Masashi Mitsuishi; Hiroshi Suzuki, and Tetsuo Matsushita, all of Nobeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed May 12, 1975, Ser. No. 576,745

Claims priority, application Japan, May 15, 1974, 49-53392; July 5, 1974, 49-62794

Int. Cl.² D01D *5/06*

U.S. Cl. 264—184 **9 Claims**

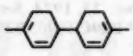


1. A process for manufacturing fibers by wet spinning an anisotropic dope of an aromatic polymer having aromatic mononucleus or polynucleus divalent radicals, in which chain extending bonds from each aromatic nucleus are coaxial or parallel and oppositely directed, which radicals are selected from the group consisting of

(A)

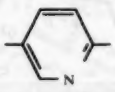
p-phenylene

4,4'-biphenylene



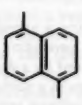
1,4-naphthylene

2,5-pyridylene

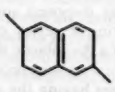


(B)

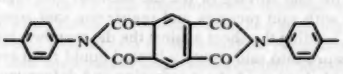
1,5-naphthylene



2,6-naphthylene



(C)



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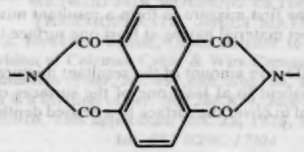
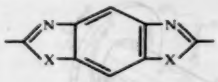
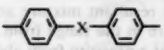




wherein X is a member selected from the group consisting of —O—, —S— and —NH—, and

(D)



wherein X is composed of two or four enchained atoms such that the divalent radical of the formula exhibits a conjugated system as a whole and which are connected by at least one link composed of a member selected from the group consisting of —NHCO—, —NHCOCOHN— and —CONHNHCO—, the process comprising the steps of

dissolving the polymer in at least one solvent selected from the group consisting of sulfuric acid, chlorosulfuric acid, fluorosulfuric acid, dimethylacetamide, N-methylpyrrolidone, tetramethylurea, hexamethylphosphoramide, dimethylsulfoxide and tetramethylene sulfonic acid to form an anisotropic dope, the polymer having an inherent viscosity of at least 3.0 as measured at a concentration of 0.3g per 100 ml of 98% sulfuric acid at 30+ C.

b. forming filaments by extruding the dope into a coagulation bath,

c. removing the filaments from the bath,

d. depositing the filaments onto a conveyor at a rate greater than the linear speed of the conveyor,

e. washing the filaments on the conveyor, and

f. drying the resulting filaments.

the steps of the process being conducted in a manner such that the filaments are formed in the substantial absence of any tension being applied to the filaments.

4,016,237

PROCESS FOR SEPARATION OF THE RARE EARTHS BY SOLVENT EXTRACTION

George W. Mason, Clarendon Hills, and Sonia Lewey, Joliet, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

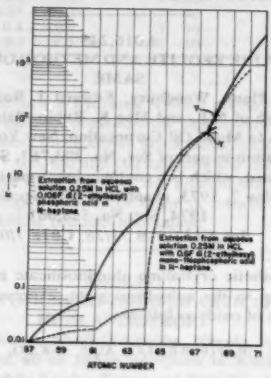
Filed Sept. 8, 1975, Ser. No. 611,272

Int. Cl.² C01F *17/00*

U.S. Cl. 423—21 **5 Claims**

1. In the method for separating rare earth and yttrium elements from each other by contacting an aqueous mineral acid feed solution containing a plurality of rare earths and yttrium with a plurality of solutions of an organic extractant in a water-immiscible organic diluent whereby the elements having the highest atomic number are preferentially extracted from the feed solution and the extractability of the elements decreases with decreasing order of atomic number, contacting the extractant with a plurality of aqueous mineral acid scrub solutions whereby the rare earths are separated into fractions in the aqueous and organic solutions according to their atomic number, the lower atomic number elements preferentially

concentrating in the scrub solutions in decreasing order of their atomic number and the higher atomic number elements preferentially concentrating in the organic extractant solutions in increasing order of their atomic number and collecting each fraction separately, the improvement wherein the feed



and scrub solutions are 0.1 to 2.0 M in a nonoxidizing mineral acid and the organic extractant is up to 1.0 F di(2-ethylhexyl) mono-thiophosphoric acid in a water-immiscible organic diluent whereby higher concentrations of rare earth and yttrium elements are extracted from the feed solution without forming an insoluble polymer with the extractant.

4,016,238

PROCESS FOR THE OBTENTION OF ALUMINA AND PHOSPHATE VALUES BY THE ALKALINE DECOMPOSITION OF SILICA-CONTAINING ALUMINUM PHOSPHATE ORES

Fernando Urbina-Davalos, Rio Marne No. 14, Mexico 5, D.F., Mexico

Filed Aug. 29, 1975, Ser. No. 608,949

Int. Cl.² C01F *7/06*; C01B *25/18*; C01F *7/14*

U.S. Cl. 423—119 **11 Claims**

1. A process for the alkaline treatment of silica-containing aluminum phosphate ores for the recovery of alumina and phosphate values therefrom, which comprises in combination the steps of:

a. calcining the ore at a temperature of at least 500° C;

b. grinding the calcined ore down to a particle size of from 20 to 60 mesh (U.S. Sieve);

c. treating the calcined and ground ore with a caustic alkali lye having a concentration of at least 20% by weight of free caustic alkali to produce a suspension containing solid silica, iron oxide and other heavy metal oxides;

d. quickly filtering the suspension thus obtained to remove the solid silica and other heavy metal oxides originally contained in the ore;

e. adding a concentrated caustic alkali lye of at least 50% free caustic alkali concentration to the filtrate, in an amount sufficient to obtain a total concentration of from 10 to 15% by weight of free caustic alkali in the liquor;

f. cooling the alkaline liquor with the aid of an elutriation action to crystallize the tribasic alkali phosphate;

g. removing the thusly crystallized tribasic alkali phosphate; and

h. recovering a practically pure sodium aluminate aqueous solution which is thereafter coverted into alumina.

9. A process according to claim **1** including the additional steps of dissolving the tribasic alkali phosphate in water, treating the same with lime to form tricalcium phosphate and to regenerate the caustic alkali; recycling the caustic alkali solution thus obtained to the alkali treatment step of the ore upon concentration thereof; recovering the tricalcium phosphate from the liquor; reacting the same with sulfuric acid to obtain gypsum and phosphoric acid; reducing the gypsum by means of coal into lime for reutilization in the process with the production of sulfur dioxide; and using said sulfur dioxide to obtain sulfuric acid for use in the process, the lime obtained in the reduction step being also reused in the process to treat the phosphate solution.

4,016,239

RECARBONATION OF SPENT OIL SHALE

Donald M. Fenton, Anaheim, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed May 22, 1975, Ser. No. 579,778

Int. Cl.² C01F *11/18*

U.S. Cl. 423—155 **10 Claims**

1. A method for decreasing the alkalinity of spent granular oil shale which, during or following a thermal eduction, has been subjected to decarbonating temperatures in excess of about 1000° F, which comprises wetting said spent shale with at least about 10 weight-percent of an aqueous solution containing sufficient of a dissolved salt selected from the class consisting of carbonates and bicarbonates to provide at least about 50 mg/l of carbonate and/or bicarbonate ions, and thereafter contacting the wetted shale with a carbonating gas comprising at least about 0.1 psi of CO_2 for a sufficient time to reduce the volume of aqueous leachings obtainable therefrom, and having a pH above 9.0, to below about 10 volumes per volume of said spent shale.

4,016,240

PRODUCTION OF SYNTHETIC ANHYDRITE

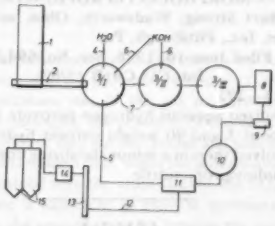
Friedrich Hinsche, Leverkusen, and Kurt Schaupp, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 22, 1974, Ser. No. 472,382

Claims priority, application Germany, June 16, 1973, 2330728

Int. Cl.² C04B *11/06*

U.S. Cl. 423—170 **10 Claims**



1. In the production of synthetic anhydrite wherein calcium fluoride and sulfuric acid are reacted to form hydrofluoric acid, the hydrofluoric acid is removed leaving a residue comprising synthetic insoluble anhydrite and acid, and recovering synthetic anhydrite from the residue, the improvement which comprises separating the fines from the residue, suspending said fines-free residue in water with vigorous agitation, neutralizing said residue, grinding the suspension, separating water from the suspension to leave synthetic insoluble anhydrite containing about 10 to 50% of water by weight, mixing the residual material with the previously separated fines, and thereafter allowing said mixture to set.

4,016,241

PROCESS FOR REDUCING NITROGEN OXIDES FROM FLUE GAS

Eiichiroh Nishikawa, Ohi; Takuji Itoh, Sayama, and Setsuo Kamiyama, Ohi, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 16, 1975, Ser. No. 613,962

Claims priority, application Japan, Sept. 20, 1974, 49-108417

Int. Cl.² B01D 53/34

U.S. Cl. 423—239 5 Claims

1. A process for removing nitrogen oxides from a gas mixture containing nitrogen oxides and oxygen which comprises adding to said gas mixture a reducing agent selected from the group consisting of an olefin of 2 to 6 carbon atoms, benzene and toluene, said reducing agent being added in an amount of up to about 1/20 mole percent based on oxygen in the gas and an amount ranging between about 0.1 and about 20 moles per mole of nitrogen oxide, and contacting said mixture, at a temperature within the range of about 200° to 450° C, with a catalyst comprising iridium or a compound thereof supported on a refractory carrier.

4,016,242

SALTS OF THE IODINE OXYACIDS IN THE IMPREGNATION OF ADSORBENT CHARCOAL FOR TRAPPING RADIOACTIVE METHYLIODIDE

Victor R. Deitz, Chevy Chase, and Charles H. Blachly, West Hyattsville, both of Md., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Feb. 26, 1976, Ser. No. 661,572

Int. Cl.² B01D 53/34

U.S. Cl. 423—240 3 Claims

1. The method of removing methyliodide^{131} gas from the effluent of reactor comprising passing said effluent gas through a charcoal sorbent formed by first contacting charcoal with an aqueous mixture of a first component comprising a salt of the iodine oxyacids selected from the group consisting of periodate, iodate and hypoiodite and a second component selected from the groups consisting of iodine and iodide salt, the aqueous mixture being adjusted to a pH of about 10, and then contacting the resulting impregnated charcoal with a tertiary amine.

4,016,243

HYDROGEN PEROXIDE STABILIZATION WITH 3-N-MORPHOLINYLPROPIONITRILES

Walker Albert Strong, Wadsworth, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed June 10, 1976, Ser. No. 694,501

Int. Cl.² C01B 15/02

U.S. Cl. 423—272 10 Claims

1. A stabilized aqueous hydrogen peroxide solution having between about 3 and 90 weight percent hydrogen peroxide, having dissolved therein a minor stabilizing concentration of a 3-N-morpholinylpropionitrile.

4,016,244

PROCESS FOR PRODUCTION OF CUBIC BORON NITRIDE

Kenzo Susa, Hachioji; Toshio Kobayashi, Kokubunji; Satoshi Taniguchi, Tokorozawa, and Mitsuru Ishii, Higashi-yamato, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 23, 1975, Ser. No. 543,430

Claims priority, application Japan, Jan. 23, 1974, 49-9372; Feb. 27, 1974, 49-22349; May 8, 1974, 49-50301; Apr. 26, 1974, 49-46484

Int. Cl.² C01B 35/14

U.S. Cl. 423—290 13 Claims

1. In the process for synthesizing cubic boron nitride by using graphitic hexagonal boron nitride as the raw material and applying to said raw material such high temperature and high pressure that cubic boron nitride is thermodynamically stable, and improvement wherein water is incorporated in the raw material in an amount of at least 3% by weight, the high pressure is applied for at least 2 minutes, the applied temperature is at least about 600° C. and the applied high pressure is at least about 50 Kbar.

4,016,245

CRYSTALLINE ZEOLITE AND METHOD OF PREPARING SAME

Charles J. Plank, Woodbury; Edward J. Rosinski, Pedricktown, both of N.J., and Mae K. Rubin, Bala Cynwyd, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 393,767, Sept. 4, 1973, abandoned, which is a continuation-in-part of Ser. No. 358,192, May 7, 1973, abandoned. This application Nov. 29, 1974, Ser. No. 528,061

Int. Cl.² C01B 33/28; C07F 7/02

U.S. Cl. 423—328 13 Claims

1. A synthetic crystalline aluminosilicate zeolite having a composition in the anhydrous state, expressed in terms of mole ratios of oxids as follows:

$$(0.3\text{–}2.5)R_2O:(0\text{–}0.8)M_2O : Al_2O_3 : >8\ SiO_2$$

wherein R is an organic nitrogen-containing cation derived from ethylenediamine or pyrrolidine and M is an alkali metal cation and having an X-ray powder diffraction pattern as that shown in Table 1 of the specification, the sorption capacity of said zeolite after calcination at 600° C being characterized by the ratio of normal hexane sorption to 2-methylpentane sorption at 90° C of less than 10.

8. A method for preparing the crystalline aluminosilicate zeolite defined in claim 1 which comprises preparing a mixture containing sources of an alkali metal oxide, an organic nitrogen-containing oxide, an oxide of aluminum, an oxide of silicon and water and having a composition, in terms of mole ratios of oxides, falling within the following ranges:

R^+	
$R^+ + M^+$	0.2–1.0
OH^-/SiO_2	0.05–0.5
H_2O/OH^-	41–500
SiO_2/Al_2O_3	8.8–200

wherein R is an organic nitrogen-containing cation derived from ethylenediamine or pyrrolidine and M is an alkali metal ion, maintaining the mixture at a temperature of at least 90° F until the crystals of said aluminosilicate are formed.

4,016,246

MANUFACTURE OF SYNTHETIC ZEOLITES

Thomas Vincent Whittam, Yarm-on-Tees, England, assignor to Laporte Industries Limited, London, England

Continuation-in-part of Ser. No. 889,339, Dec. 30, 1969, abandoned, which is a continuation-in-part of Ser. No. 536,310, March 22, 1966, abandoned. This application Aug. 30, 1972, Ser. No. 284,860

Claims priority, application United Kingdom, Apr. 9, 1965, 15104/65; Nov. 10, 1965, 47616/65

Int. Cl.² C01B 33/28

U.S. Cl. 423—329 8 Claims

1. A method of preparing zeolite Y of high degree of purity and having a silica to alumina molar ratio of from greater than 3.0 up to about 6.2 which comprises (a) preparing an aqueous aluminosilicate reaction mixture by mixing an active hydrated sodium metasilicate, an alumina component and an Na_2O component or an active hydrated sodium metasilicate, an alumina component, an Na_2O component and other siliceous material, the reaction mixture having a composition expressed in terms of oxide molar ratios within the following ranges:

	Na_2O/SiO_2	SiO_2/Al_2O_3	H_2O/Na_2O
(1)	0.28 – <0.30	8 – 10	20 – 70
(2)	0.30 – <0.31	8 – 12	20 – 70
(3)	0.31 – <0.32	8 – 14	20 – 70
(4)	0.32 – <0.34	8 – 16	12 – 90
(5)	0.34 – <0.40	7 – 40	12 – 120
(6)	0.4 – <0.7	5 – 50	12 – 120
(7)	0.7 – 1.0	31 – 50	12 – 120

the ratio of the active hydrated sodium metasilicate to any other siliceous material present in the aluminosilicate reaction mixture expressed on a molar silica basis lying within the range 1.0:0 to 1.0:6,000 and (b) agitating the aluminosilicate reaction mixture while heating the aluminosilicate reaction mixture at a temperature in the range of from 20° C. to 120° C. until a crystalline product is obtained.

4,016,247

PRODUCTION OF CARBON SHAPED ARTICLES HAVING HIGH ANISOTROPY

Sugio Otani, Kiryu; Shoji Watanabe, Niigata, and Tadashi Araki, Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo and Toyo Boseki Kabushiki Kaisha, Osaka, both of, Japan

Continuation-in-part of Ser. No. 20,050, March 16, 1970, abandoned. This application Apr. 3, 1975, Ser. No. 564,895

Claims priority, application Japan, Mar. 31, 1969, 44-24161

Int. Cl.² C01B *31/02, 31/04, 31/07*

U.S. Cl. 423—447.4 **3 Claims**

1. In a method for producing carbon shaped articles having high molecular orientation, anisotropy, and modulus of elasticity from pitch as the raw material through the process steps of forming the pitch into the required shape, subjecting the same to infusibilization, carbonization, and optionally graphitization treatments, the improvement which comprises:

forming said raw material pitch having specific properties of the carbon content in the range of from 95 to 96.5% by weight, a mean molecular weight of from 400 to 2,000, melt viscosity of from 0.4 to 700 poises at a temperature range of from 320° C to 480° C, said pitch possessing an anisotropic structure and excellent fluidity; and then carrying out said process steps of the infusibilization, carbonization, and optionally graphitization of said shaped articles, in sequence, without applying any tension whatsoever thereto during said treatments, said raw material pitch being obtained by subjecting tetrabenzophenazine to heat treatment at a temperature of from 450° to 600° C for 30 to 90 minutes.

4,016,248

PROCESS FOR THE CATALYTIC CONVERSION OF SO_2 TO SO_3

Karel Vydra, and Zdenek Hubalek, both of Bad Nauheim, Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 443,916, Feb. 19, 1974, abandoned. This application Feb. 27, 1976, Ser. No. 662,168

Claims priority, application Germany, Feb. 17, 1973, 2307973

Int. Cl.² C01B *17/68, 17/76*

U.S. Cl. 423—533 **2 Claims**

1. In a process for converting the SO_2 content of gases containing SO_2 in an amount of 10.5% to 66% by volume to SO_3 by contact catalysis wherein:

a. a partial stream of the SO_2-containing gas is branched from a main stream thereof:

b. the partial stream of SO_2-containing gas is brought to an inlet temperature corresponding to at least the initiation temperature of a first contact-catalysis stage and the SO_2 in said partial stream is partially oxidized to SO_3 in contact with an SO_2-oxidation catalyst at the temperature of the SO_2-containing gas introduced into said first stage;

c. the partial stream of SO_2-containing gas partially transformed to SO_3 is admixed with the remainder of said main stream; and

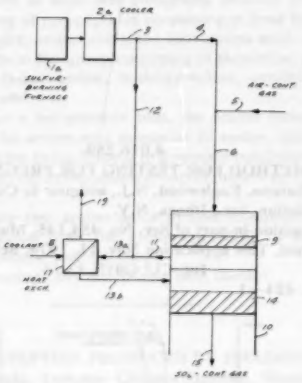
d. the mixture of the main and partial streams is brought to the operating temperature of a second contact-catalysis stage to transform SO_2 in the mixture to SO_3,

the improvement which comprises:

e. mixing air, oxygen or oxygen-enriched air free from SO_3 with the partial stream of SO_2-containing gas prior to its introduction into the first contact-catalysis stage (b) to reduce the concentration of SO_2 in the gas mixture treated in said first contact-catalysis stage below that at which the catalyst thereof is damaged by temperature rise due to the conversion of SO_2 to SO_3;

f. treating said mixture in said first stage until the equilibrium condition of said mixture is approximately reached;

g. the amount of oxygen introduced by said admixture of air, oxygen or oxygen-enriched air free of SO_3 being at least the stoichiometric amount necessary for oxidizing an SO_2 amount in the gas mixture in step (f) which results in a temperature rise of the gas mixture which is just below the damaging temperature of the catalyst;



h. the quantities of said partial stream and said main stream being so determined that, when the gases leaving said first stage are mixed with the main stream, the SO_2 content in the mixture is sufficient to prevent deterioration of the catalyst in the second stage by treating the mixture in the second stage until the equilibrium condition of the mixture is reached;

i. treating the gas stream leaving said second stage in subsequent contact-catalysis stages without admixture of SO_2-containing gases; and

j. said main stream (a) being at a higher temperature than the operating temperature of said second stage, said partial stream of SO_2-containing gas being cooled to the inlet temperature of said first stage by said mixing with air, oxygen or oxygen-enriched air, and cooling the mixture of the partially transformed gas with the remainder of said main stream in a heat exchanger prior to its introduction into said second stage.

4,016,249
BONE SEEKING TECHNETIUM 99M COMPLEX

Norman Adler, Arlington, and Leopoldo Lazaro Camin, Lexington, both of Mass., assignors to New England Nuclear Corporation, Boston, Mass.

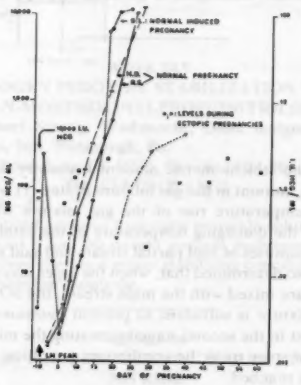
Division of Ser. No. 288,577, Sept. 13, 1972, Pat. No. 3,851,044. This application Oct. 26, 1973, Ser. No. 410,086
Int. Cl.[2] A61K *29/00, 43/00;* G01T *1/161*
U.S. Cl. 424—1 37 Claims

1. A metabolizable radioactive bone seeking solution for intravenous administration to mammals comprising a technetium-99[m]-stannous-phosphate complex, the phosphate moiety of which comprises pyrophosphate, said complex being in sterile, non-pyrogenic solution in a pharmaceutically acceptable vehicle at a pH of between 3 and 8, said phosphate moiety containing not substantially more than 25% by weight of linear polyphosphates of formulation $P_nO_{3n+1}^{-(n+2)}$ having a molecular weight greater than pyrophosphate.

4,016,250
METHOD FOR TESTING FOR PREGNANCY

Brij B. Saxena, Englewood, N.J., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Continuation-in-part of Ser. No. 454,145, March 22, 1974, abandoned. This application Nov. 11, 1974, Ser. No. 522,760
Int. Cl.[2] G01N *33/16*
U.S. Cl. 424—1 44 Claims



1. In a method for the determination of human chorionic gonadotropin (HCG), luteinizing hormone (LH) or HCG-like material in an aqueous sample involving the steps of contacting said sample with an agent capable of selectively binding said hormone, providing a means for indicating whether said binding has taken place and observing said indicating means to determine the presence of said hormone in the sample, the improvement which comprises said agent capable of selectively binding said hormone being a plasma membrane extract from the corpus luteum of a species possessing the receptor for human chorionic gonadotropin.

4,016,251
VAGINAL DRUG DISPENSING DEVICE

Takeru Higuchi, and Anwar Hussain, both of Lawrence, Kans., assignors to Alza Corporation, Palo Alto, Calif.

Division of Ser. No. 281,446, Aug. 17, 1972, Pat. No. 3,903,880, which is a continuation-in-part of Ser. No. 80,531, Oct. 14, 1970, abandoned. This application May 30, 1975, Ser. No. 582,131
The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.
Int. Cl.[2] A61K *9/00, 47/00*
U.S. Cl. 424—15 22 Claims

1. A vaginal insert comprising a reservoir for containing a drug, a drug in the reservoir, a polymeric barrier through which the drug passes by diffusion as it is released from the reservoir, the improvement wherein said barrier is an ethylene-vinyl acetate copolymer having a vinyl acetate content of 4 to 80% by weight and a melt index of about 0.1 to 1000 grams per ten minutes.

4,016,252
CALCIUM PHOSPHATE GEL FOR ADSORBING VACCINES

Edgar Hans Relyveld, Paris, France, assignor to Institut Pasteur, Paris, France

Continuation-in-part of Ser. No. 610,333, Sept. 4, 1975, abandoned, which is a continuation of Ser. No. 342,932, March 20, 1973, Pat. No. 3,925,545. This application Dec. 11, 1975, Ser. No. 639,926
Claims priority, application France, Apr. 6, 1972, 72.12036
Int. Cl.[2] A61K *39/00, 39/02, 39/12, 47/00*
U.S. Cl. 424—88 9 Claims

1. An injectable aqueous gel of calcium phosphate for adsorbing vaccines, wherein calcium and PO_4 ion are combined in such proportions that the weight ratio Ca/P is from 1.62 to 1.85, the settling time of the gel when containing 0.07 atom Ca per liter, being from 1 to 20 mm in 10 minutes at 20° C.

4,016,253
VACCINE FOR IMMUNIZATION OF SWINE AGAINST *BORDETELLA BRONCHISEPTICA* INFECTION AND METHOD OF USE

William P. Switzer, and Daniel O. Farrington, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Continuation-in-part of Ser. No. 564,546, April 2, 1975, abandoned. This application Mar. 29, 1976, Ser. No. 671,359
Int. Cl.[2] A61K *39/02*
U.S. Cl. 424—92 14 Claims

1. A vaccine in parenterally injectable dose form for administration to animals subject to *Bordetella bronchiseptica* infection, consisting essentially of an effective adjuvant in admixture with killed whole cells of the strain of *Bordetella bronchiseptica* identified by ATCC No. 31124, said vaccine dose containing from 10^9 to 10^{11} cells of said strain.

4,016,254
PHARMACEUTICAL FORMULATIONS

Harry Seager, Worthing, England, assignor to Beecham Group Limited, Great Britain

Continuation of Ser. No. 360,828, May 16, 1973, abandoned. This application Apr. 5, 1976, Ser. No. 673,441
Claims priority, application United Kingdom, May 19, 1972, 23576/72
Int. Cl.[2] A61K *9/50, 31/43, 31/79*
U.S. Cl. 424—33 48 Claims

1. A powder comprising 0% to 95% of conventional pharmaceutical excipients and 5% to 100% of microcapsules, having an average diameter of from 100 μ to 300 μ and which consist of 94% to 99.9% of a β-lactam antibiotic coated by 0.1% to 6% of polyvinylpyrrolidone.

4,016,255

ORAL HYGIENE COMPOSITIONS

Geoffrey Charles Forward, Redhill, and Susan Ann Duke, Croydon, both of England, assignors to Beecham Group Limited, Great Britain

Filed Sept. 11, 1975, Ser. No. 612,285

Claims priority, application United Kingdom, Sept. 28, 1974, 42238/74

Int. Cl.² A61K *7/18, 7/22*

U.S. Cl. 424—52 15 Claims

1. An oral hygiene composition comprising a physiologically acceptable water-soluble fluoride compound selected from sodium fluoride, potassium fluoride, ammonium fluoride, stannous fluoride, sodium monofluorophosphate and mixtures thereof and a physiologically acceptable water-soluble ammonium compound selected from ammonium chloride, ammonium bromide, ammonium sulfate, ammonium triphosphate, ammonium dihydrogen phosphate, diammonium hydrogen phospate and mixtures thereof, the molar ratio of available ammonium ion to available fluoride in said composition being 1.2:1 or greater.

4,016,256

ANTIBIOTIC TS-0822

Nakao Ishida; Fumio Kitame, both of Sendai; Kuniko Utsushikawa, Nagoya; Tomoaki Kohama; Takuya Saito, both of Sendai, and Mikio Kikuchi, Osaka, all of Japan, assignors to Kayaku Antibiotic Research Co., Ltd., Japan

Filed Nov. 19, 1975, Ser. No. 633,475

Int. Cl.² A61K *35/74*

U.S. Cl. 424—121 11 Claims

1. The antibiotic TS-0822 in the form of colorless columnar crystals, the antibiotic in free form exhibiting main absorption bands in its infrared absorption spectrum as shown in FIG. 2, said antibiotic having an elemental analysis of about C:60.12%, H:8.94%, and N:0%, a molecular weight of about 720, a specific rotation of $[\alpha]_D^{15} + 51.3°$, (C = 0.07, $CHCl_3$), a melting point of from 151° to 153° C, an ultraviolet absorption spectrum substantially as shown in FIG. 1, and being soluble in benzene, ethyl acetate, chloroform, dichloromethane, acetone, n-butanol, ethanol, methanol, dimethyl sulfoxide, and pyridine and being insoluble or only slightly soluble in water, Tollens' reagent Molisch reagent, ferric chloride, Liebermann's reagent and ninhydrin.

4,016,257

AMIDE DERIVATIVES OF ACIDS, AN ANTIBIOTIC PRODUCED BY *POLYANGIUM CELLULOSUM* VAR. *FULVUM*

David T. Connor, Parsippany; Samuel M. Ringel, Rockaway, and Maximilian von Strandtmann, Rockaway Township, Morris County, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Aug. 7, 1975, Ser. No. 602,844

Int. Cl.² A61K *35/74*

U.S. Cl. 424—122 5 Claims

1. The antibiotic substance, acid S (n-butylamine) amide, having the following characteristics:

Empirical formula: $C_{29}H_{51}NO_5$

Molecular weight: 529.7

Infrared Spectrum as shown in FIG. 1: ν max 3500–3200 cm^{-1} (OH and NH), 1670cm^{-1} (C = O of amide)

Mass Spectrum of the corresponding diacetate: Molecular ion at 613 corresponding to $C_{36}H_{55}NO_7$ *m/e* (relative intensity) 613 (22), 595 (18), 584 (45), 554 (18), 543 (18), 518 (54), 421 (50), 300 (100) and 283 (90).

4,016,258

VASOACTIVE INTESTINAL PEPTIDE FROM FOWL

Sami I. Said, 5323 Harry Hines Blvd., Dallas, Tex. 75235; Viktor Mutt, and Ann Nilsson, both of Medecinska Nobelinstitutet, Stockholm, Sweden

Filed Aug. 5, 1975, Ser. No. 602,102

Int. Cl.² A61K *37/00;* C07C *103/52*

U.S. Cl. 424—177 10 Claims

7. The novel purified polypeptide having the following structure:

His-Ser-Asp-Ala-Val-Phe-Thr-Asp-Asn-Tyr-Ser-Arg-Phe-Arg-Lys-Gln-Met-Ala-Val-Lys-Lys-Tyr-Leu-Asn-Ser-Val-Leu-Thr-NH_2.

10. A method for producing bronchodilation in animals and humans comprising administration by inhalation of a therapeutically effective amount of the polypeptide of claim 7.

4,016,259

CONTRACEPTIVE POLYPEPTIDES

Harry A. Kent, Jr., Athens, Ga., assignor to Research Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 492,179, July 26, 1974, abandoned. This application May 23, 1975, Ser. No. 580,235

Int. Cl.² C07C *103/52;* A61K *37/00*

U.S. Cl. 424—177 18 Claims

10. A composition comprising a pharmaceutically acceptable carrier and at least one compound selected from the group consisting of polypeptides containing at least four, and up to about eight, amino acids, the four amino acids being:

1. selected from the group consisting of threonine, proline, arginine, lysine serine, hydroxyproline, ornithine and histidine; and
2. formed in a tetrapeptide unit, the amino terminus of which is the amino acid threonine or serine, said threonine or serine being formed in a peptide bond through its carboxyl group to the amino group of proline or hydroxyproline;

the remaining two amino acids in said tetrapeptide unit being selected from the group consisting of arginine, lysine, ornithine and histidine,

and pharmacologically acceptable salts thereof.

4,016,260

NOVEL POLYPEPTIDE PRODUCED BY PSEUDOMONAS

Tadashi Karasaki, Toyama; Chikako Hayashi, Koyabe, and Etsuko Furuichi, Toyama, all of Japan, assignors to Toyama Chemical Co., Ltd., Tokyo, Japan

Filed July 17, 1975, Ser. No. 596,669

Claims priority, application Japan, July 22, 1974, 49-83887; May 22, 1975, 50-60251

Int. Cl.² A61K *35/74, 37/02;* C12D *9/20*

U.S. Cl. 424—177 23 Claims

1. A process for producing the novel polypeptide Gamba A which comprises aerobically culturing in the presence of nutrient sources the variant strain of Pseudomonas cruciviae which is Pseudomonas sp. No. 2205 (FERM-P 2132, ATCC 3115) and recovering the resulting Gamba A polypeptide from the broth having the following physicochemical properties:

a. A polypeptide

b. Melting point: 206° C (decomp.)

c. Specific rotation: D 27 −54° (concentration 0.3% in water)

d. Ultraviolet absorption spectrum shows no specific absorption

Infrared absorption spectrum: Absorptions observed at 2.95, 3.40, 6.05, 6.55, 6.95, 7.20, 8.15 and 9.00μ as shown in FIG. 1

f. Solubility in solvents: Easily soluble in water; soluble in methanol and ethanol; sparingly soluble in butanol; and insoluble in acetone, benzene, chloroform, ethyl acetate, pyridine, dioxane and dimethylformamide

g. Biuret reaction: positive,Ninhydrin reaction: negative,Or-

cinol reaction: negative,Ferric chloride reaction: negative, Sakaguchi's reaction: positive,Silver nitrate reaction: negative

h. An acidic substance

i. A white to pale yellow granular powder

j. Constitutive amino acids: A hydrolyzate obtained by treating the present substance with N-HCl under reflux for 24 hours was identified according to thin layer chromatography to confirm that at least alginine and threonine were present as constitutive amino acids

k. Since the present substance is a high molecular weight compound, no significant elementary analysis values and molecular weight (according to freezing point depression method) thereof can be measured by usual test methods.

22. The Gamba A polypeptide produced by the process according to claim **1.**

4,016,261
THERAPEUTIC COMPOSITION AND METHOD OF THERAPEUTICALLY TREATING WARM BLOODED ANIMALS THEREWITH

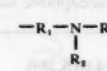
Paul Gordon, Chicago, Ill., assignor to Strategic Medical Research Corporation, Murray, Utah

Division of Ser. No. 337,134, March 1, 1973, Pat. No. 3,939,145. This application Sept. 2, 1975, Ser. No. 609,723

Int. Cl.² A61K *31/70*

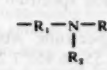
U.S. Cl. 424—180 **46 Claims**

1. A novel therapeutic composition comprising a pharmaceutically acceptable carrier containing a therapeutically effective amount of at least one substance selected from the group consisting of ethereally monosubstituted monosaccharides having the formula S-O-Y, and therapeutically effective and pharmaceutically acceptable organic acid and inorganic acid salts thereof, wherein S is the residue of a monosaccharide selected from the group consisting of pentoses, hexoses and heptoses and Y is selected from the group consisting of cyclic monovalent nitrogen containing organic radicals and monovalent organic radicals having the general formula



wherein R_1 is a divalent organic radical having a linear carbon chain length of about 1–7 carbon atoms and R_2 and R_3 are selected from the group consisting of —H, —OH, SH, halogen and monovalent organic radicals having a linear carbon chain length of about 1–7 carbon atoms.

20. A method of therapeutically treating a warm blooded animal comprising therapeutically administering thereto a therapeutically effective amount of at least one substance selected from the group consisting of ethereally monosubstituted monosaccharides having the formula S—O—Y and therapeutically effective and pharmaceutically acceptable organic acid and inorganic acid salts thereof, wherein S is the residue of a monosaccharide selected from the group consisting of pentoses, hexoses and heptoses and Y is selected from the group consisting of cyclic monovalent nitrogen containing organic radicals and monovalent organic radicals having the formula



wherein R_1 is a divalent organic radical having a linear carbon chain length of about 1–7 carbon atoms and R_2 and R_3 are selected from the group consisting of —H, —OH, —SH, halogen and monovalent organic radicals having a linear carbon chain length of about 1–7 carbon atoms.

4,016,262
THERAPEUTIC COMPOSITIONS AND METHODS EMPLOYING N(6)-DISUBSTITUTED ADENOSINE COMPOUNDS

Erich Fauland, Mannheim-Gartenstadt; Wolfgang Kampe, Heddesheim, both of Germany; Kurt Stach, deceased, late of Mannheim-Waldhof, Germany; by Werner Plattner, executor, Linz, Austria; Harald Stork, Mannheim-Feudenheim, and Karl Dietmann, Mannheim-Vogelstang, both of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

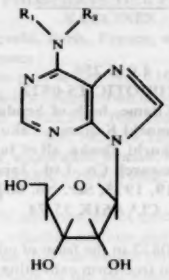
Division of Ser. No. 482,976, June 25, 1974, Pat. No. 3,929,764. This application May 30, 1975, Ser. No. 582,529

Claims priority, application Germany, Aug. 1, 1973, 2338963

Int. Cl.² A61K *31/70*

U.S. Cl. 424—180 **30 Claims**

1. Therapeutic composition for the treatment of excessively high fatty acid, triglyceride, or cholesterol contents in the serum of a mammal which composition comprises an effective amount of N(6)-disubstituted adenosine compound of the formula:



(I),

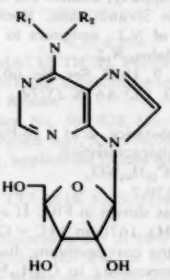
wherein

R_1 is alkenyl of up to 6 carbon atoms, cycloalkenyl or cycloalkenylalkyl of 5 to 10 carbon atoms in the cyclic moiety and up to 6 carbon atoms in the alkyl moiety; and

R_2 is alkenyl of up to 6 carbon atoms, cycloalkenyl of 5 to 10 carbon atoms, straight or branched-chain alkyl of up to 6 carbon atoms, cycloalkyl of 5 to 10 carbon atoms, bicycloalkyl of up to 10 carbon atoms, alkylcycloalkyl of from 5 to 10 carbon atoms in the cyclic moiety and up to 6 carbon atoms in the alkyl moiety; or alkyl-bicycloalkyl of up to 6 carbon atoms in the alkyl moiety and of up to 10 carbon atoms in the bicycloalkyl moiety; or a pharmacologically acceptable salt thereof

and a pharmaceutically acceptable carrier.

2. Method for treating a mammal afflicted with too great a concentration of fatty acids, triglycerides or cholesterol in its serum which method comprises administering to such mammal effective amounts of an N(6)-disubstituted adenosine compound of the formula:



(I),

wherein

R_1 is alkenyl, of up to 6 carbon atoms, cycloalkenyl or cycloalkenylalkyl of 5 to 10 carbon atoms in the cyclic moiety and up to 6 carbon atoms in the alkyl moiety; and

R_2 is alkenyl of up to 6 carbon atoms, cycloalkenyl of 5 to 10 carbon atoms, straight or branched-chain alkyl of up to 6 carbon atoms, cycloalkyl of 5 to 10 carbon atoms, bicycloalkyl of up to 10 carbon atoms, alkylcycloalkyl of from 5 to 10 carbon atoms in the cyclic moiety and up to 6 carbon atoms in the alkyl moiety; or alkyl-bicycloalkyl of up to 6 carbon atoms in the alkyl moiety and of up to 10 carbon atoms in the bicycloalkyl moiety; or a pharmacologically acceptable salt thereof

and a pharmaceutically acceptable carrier.

4,016,263

N-SUBSTITUTED ERYTHROMCYLAMINES AND SALTS THEREOF

Bernd Wetzel; Eberhard Woitun; Roland Maier, all of Biberach; Wolfgang Reuter, Laupertshausen; Hanns Goeth, Biberach, and Uwe Lechner, Ummendorf, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhine, Germany

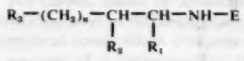
Filed Mar. 29, 1976, Ser. No. 671,422

Claims priority, application Germany, Apr. 7, 1975, 2515078; Feb. 19, 1976, 2606663; Feb. 19, 1976, 2606662

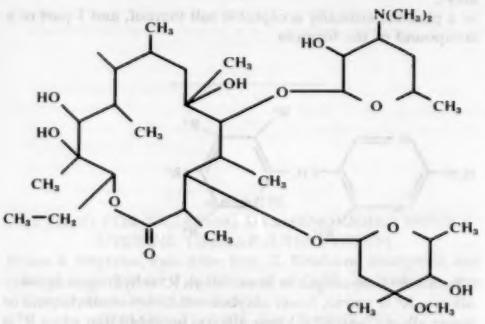
Int. Cl.[2] A61K *31/70*

U.S. Cl. 424—180 **13 Claims**

1. A compound of the formula



wherein E is



R_1 is hydrogen; straight or branched alkyl of 1to 3 carbon atoms; (alkoxy of 1 to 5 carbon atoms)- (alkyl of 1 to 3 carbon atoms); phenyl; or benzyl;

R_2 is hydrogen, hydroxyl, straight or branched alkyl of 1 to 3 carbon atoms; or phenyl;

R_3 is hydroxyl;

alkanoyloxy of 1to 5carbon atoms; benzoyloxy; straight or branched alkoxy of 1 to 5 carbon atoms; amino;- mono(alkyl of 1 5 carbon atoms)-amino;

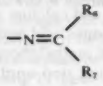
dialkyl-amino, where the sum of carbon atoms in the alkyls is from 2 to 8 inclusive;

mono(hydroxy-alkyl of 1 to 4 carbon atoms)-amino;

di(hydroxy-alkyl)-amino, where the sum of carbon atoms in the alkyls is from 2to 8, inclusive; phenyl(alkyl of 1 to 2 carbon atoms)-amino;

phenyl-amino, where the phenyl moiety may optionally have one or more halogen, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms or hydroxyl substituents attached thereto;

(alkanoyl of 1 to 5 carbon atoms)-amino; phenyl(alkanoyl of 1 to 5 carbon atoms)-amino; benzoyl-amino; methoxybenzoyl-amino; halobenzoyl-amino; carboxybenzoyl-amino; p-tolysulfonamino; -HN-NR_4R_5, where R_4 and R_5 are alkyl of 1 to 3 carbon atoms or, together with each other and the nitrogen atom to which they are attached, form a 5- to 6-membered heterocycle optionally comprising an additional oxygen, sulfur or nitrogen hetero-atom in the ring, and said additional nitrogen heteroatom optionally having an alkyl of 1 to 5 carbon atoms substituent attached thereto;



where R_6 is amino; mono(straight or branched alkyl of 1 to 8 carbon atoms)-amino; dialkyl- amino, where the sun of carbon atoms in the alkyls is from 2 to 6 inclusive; cyclohexyl-amino; N-(alkyl of 1 to 3 carbon atoms)-N-cyclohexyl-amino; dicyclohexyl- amino; methoxy(alkyl of 1 to 3 carbon atoms)-amino; dimethoxy(alkyl of 1 to 3carbon atoms)-amino; benzylamino, where the phenyl moiety may optionally have from one to three (alkoxy of 1 to 3 **29** carbon atoms)-substituents attached thereto; phenethyl-amino, where the phenyl moiety amy optionally have from one to three (alkoxy of 1 to 3 carbon atoms)-substituents attached thereto; dibenxyl-amino; di(phenethyl)-amino; benzhydryl-amino; N-methyl-N-benzyl-amino; N-phenyl- N-benzyl-amino; N-methyl-N-phenyl-amino; N-ethyl-N-phenyl-amino; piperidino; methyl- piperidino; benzyl-piperidino, pyrrol- idino; methyl-pyrrolidino; benzyl-pyrrolidino; morpholino; methyl-morpholino; benzyl-morpholino; piperazino; methyl- piperazino; benzyl-piperazino; hexamethyl- eneimino; methyl-hexamethyleneimino; benzyl-hexamethyleneimino; thiomorpholino; methyl-thiomorpholino; benzyl-thiomorpholino; heptamethyleneimino; methyl-heptamethyleneimino; or benzyl-heptamethyl- imino; and

R_7 is amino; cyclohexylamino; di(alkyl of 1 to 3 carbon atoms)-amino; benzyl-amino; phenethyl-amino; dibenzyl-amino; phenoxy-methyl-amino; phenoxyethyl-amino; N-phenyl-N-benzyl-amino; N-methyl-N-phenyl-amino; piperidino, benzyl-piperidino; pyrrolidino; benzyl-pyrrolidino; morpholino; benzyl-morpholino; piperazino; benzyl-piperazino; thiomorpholino; benzyl-thiomorpholino; hexamethyleneimino; benzyl-hexamethyleneimino;

hydrogen; alkyl of 1 to 3 carbon atoms; cyclohexyl, benzyl, methoxy-benzyl; phenethyl; methoxyphenethyl; thienyl; furyl; pyridyl; (alkyl of 1 to 3 carbon atoms)-thio; methoxy(alkyl of 1 to 3 carbon atoms)-thio; cyano(alkyl of 1 to 3 carbon atoms)-thio; benzyl-thio; methylbenzyl-thio; phenyl-thio; or tolyl-thio;

R_3 = is also-NH-A-B,

where

A is alkylene of 1 to 4 carbon atoms; and

B is alkoxy of 1 to 3 carbon atoms, di(alkyl of 1 to 3 carbon atoms)-amino or carbalkoxy of 2 to 4 carbon atoms;

thiazolyl-amino; or

pyridyl-amino; and

n is 0 or 1;

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

13. The method of combatting bacterial infections in a warm-blooded host, which comprises perorally or parenterally administering to said host an effective antibacterial amount of a compound of claim **1.**

4,016,264
WART TREATMENT WITH PHOSPHONOACETIC ACID OR DERIVATIVES THEREOF

Leland L. Clark, Salt Lake City, Utah, assignor to The University of Utah, Salt Lake City, Utah

Filed July 14, 1975, Ser. No. 595,941
Int. Cl.² A61K 31/66
U.S. Cl. 424—198 **6 Claims**

1. A method for treating a wart comprising the steps of:
contacting the wart with an effective amount of a composition comprising a suitable topical carrier, an effective amount of a tissue removing agent selected from the group consisting of salicylic acid and cantharadin and from about 0.5 to 8.0% by weight of a compound selected from the group consisting of phosphonoacetic acid, the sodium, potassium, and calcium salts of phosphonoacetic acid, methylphosphonic acid and the sodium, potassium, and calcium salts of methylphosphonic acid; and
repeating the contacting step until the wart has been suitably treated.

4,016,265
SYNERGISTIC INSECTICIDAL COMPOSITIONS CONTAINING β-EXOTOXIN

Tadahiko Inoue, Tokyo; Gosaburo Dowke, Shizuoka, and Hideo Itoh, Shimizu, all of Japan, assignors to Sandoz, Inc., E. Hanover, N.J.

Filed Nov. 8, 1971, Ser. No. 196,809
Claims priority, application Japan, Nov. 14, 1970, 45-100371
Int. Cl.² A01N 9/36
U.S. Cl. 424—200 **12 Claims**

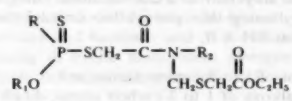
1. An insecticidal composition consisting essentially of a first ingredient selected from the group consisting of β-exotoxin and metal salts thereof and a second ingredient selected from the group consisting of O,O-diethyl-O-(2-isopropyl-4-methyl-6-pyrimidyl)-thionophosphate; O,O-dimethyl, α,α,α-trichloro-1-hydroxyethyl phosphonate; α-methoxy-4H-1,3,2-benzodioxaphosphorin-2-thione; O,O-dimethyl S-(α-(ethoxycarbonyl)benzyl) phosphorodithioate; and O,O-dimethyl S-(4-chlorophenyl) phosphorothioate; said first and second ingredients being present in the ratio of about 0.1:1 to about 10:1 by weight.

4,016,266
N-ALKYLTHIOMETHYLACETAMIDEPHOSPHORODITHIOATE INSECTICIDES

Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

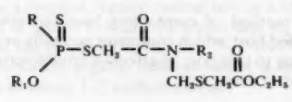
Filed June 2, 1975, Ser. No. 582,964
Int. Cl.² A01N 9/36; C07F 9/165
U.S. Cl. 424—211 **28 Claims**

1. A method for controlling insects comprising applying to the insects or the habitat thereof an insecticidally effective amount of a compound having the formula



in which R is lower alkyl or lower alkoxy and R_1 and R_2 are lower alkyl.

14. A compound having the formula



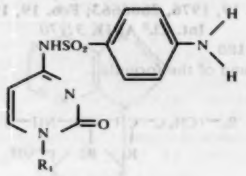
in which R is lower alkyl or lower alkoxy and R_1 and R_2 are lower alkyl.

4,016,267
SULFACYTOSINE DERIVATIVES

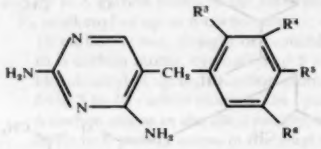
Harry Allen Albrecht, Towaco, and John Thomas Plati, Rutherford, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 587,452, June 16, 1975, abandoned, which is a division of Ser. No. 480,784, June 19, 1974, Pat. No. 3,923,792. This application June 7, 1976, Ser. No. 693,571
Int. Cl.² A61K 31/625
U.S. Cl. 424—229 **11 Claims**

11. A method for combatting bacteria comprising administering to a warmblooded animal requiring such treatment an antibacterially effective amount of a composition comprising 1 to 40 parts of a compound of the formula



wherein R_1 is cyclo-lower alkyl or cyclo-lower alkyl-lower alkyl;
or a pharmaceutically acceptable salt thereof, and 1 part of a compound of the formula



wherein R^3 is hydrogen or lower alkyl; R^4 is hydrogen or lower alkoxy, R^5 is amino, lower alkylamino, di-lower alkylamino or lower alkoxy, and R^6 is lower alkoxy, provided that when R^3 is lower alkyl, R^4 is hydrogen and R^5 is lower alkoxy,
or a pharmaceutically acceptable acid addition salt thereof.

4,016,268
METHOD OF COMBATTING GASTRIC ULCERATION

Marvin M. Goldenberg, Norwich, and Leroy J. Honkomp, Oxford, both of N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Oct. 6, 1975, Ser. No. 619,691
Int. Cl.² A61K 31/29, 31/60, 31/61, 31/625
U.S. Cl. 424—231 **1 Claim**

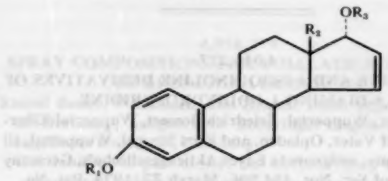
1. The method of combatting gastric ulceration in a host receiving perorally an anti-inflammatory agent of the group of aspirin, phenylbutazone, indomethacin or ibuprofen which consists in similarly co-administering to said host an amount of bismuth subsalicylate sufficient to combat the gastric ulcerogenic propensity of said anti-inflammatory agent.

4,016,269
17α-HYDROXY-1,3,5(10),15-ESTRATETRAENES AND PROCESS FOR THEIR PRODUCTION

Helmut Hofmeister; Klaus Annen; Rudolf Wiechert, and Henry Laurent, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Filed Aug. 11, 1975, Ser. No. 603,773
Claims priority, application Germany, Aug. 12, 1974, 2439082
Int. Cl.² A61K *31/58*
U.S. Cl. 424—241 15 Claims

1. A 17α-oxy-1,3,5(10),15-estratetraene of the formula



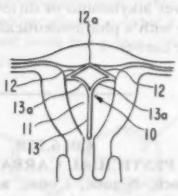
wherein R_1 is a hydrogen atom, alkyl of 1–5 carbon atoms or alkanoyl of 1–5 carbon atoms; R_2 is ethyl and R_3 is a hydrogen atom, alkyl of 1–5 carbon atoms or alkanoyl of 1–5 carbon atoms or tetrahydropyranyl or tetrahydrofuryl.

8. A pharmaceutical composition comprising an estrogenically effective amount of a compound of claim **1**, in unit dosage form and in admixture with a pharmaceutically acceptable carrier.

4,016,270
METHOD FOR TREATING DYSMENORRHEA WITH A UTERINE THERAPEUTIC SYSTEM

Bruce B. Pharriss, Palo Alto; Ross R. Erickson, Sunnyvale, and Stephen A. Tillson, Los Altos, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Filed Oct. 31, 1975, Ser. No. 627,591
Int. Cl.² A61K *31/56*
U.S. Cl. 424—242 19 Claims



1. A method for treating dysmenorrhea in a warm blooded animal which method comprises administering to the uterus of the animal from a means sized, shaped and adapted for placement in the uterus a therapeutically effective amount of a progestational steroid for a prolonged period of time to impart relief from said dysmenorrhea.

4,016,271
21-ADAMANTANE-1′-CARBOXYLATE STEROID COMPOSITIONS

Gordon Hanley Phillipps, Wembley; Alan Frederick English, Hazlemere, and Gillian Helen Stribley, Northwood, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

Continuation of Ser. No. 429,793, Jan. 2, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,178
Claims priority, application United Kingdom, Jan. 3, 1973, 447/73; Jan. 3, 1973, 448/73
Int. Cl.² A61K *31/56*
U.S. Cl. 424—243 9 Claims

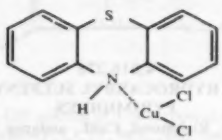
1. Pharmaceutical and veterinary compositions in dosage unit form for the systemic treatment of immunological disorders or inflammatory disorders having a significant immunological component, each dosage unit containing more than 50 mg but not more than 500 mg of betamethasone 21-adamantane- 1′-carboxylate, dexamethasone 21-adamantane- 1′-carboxylate or a corresponding 11-ketone , and a pharmaceutical or veterinary carrier or excipient.

4,016,272
ANTHELMINTIC THIODIPHENYLAMINE CUPRIC CHLORIDE COMPLEX SALT

Abdi Akbaev, perculor Sonkulsky, and Vera Vasilievna Ezhova, ulitsa Krupskoi, 55, kv. 6, both of, Frunze, U.S.S.R.

Continuation of Ser. No. 482,893, June 25, 1974, abandoned, which is a continuation of Ser. No. 319,049, Dec. 27, 1972, abandoned. This application Mar. 20, 1975, Ser. No. 560,140
Int. Cl.² A61K *31/555*, *31/54*
U.S. Cl. 424—245 4 Claims

1. A method of treating helminth infestation diseases in animals which comprises administering to an animal from 0.1 to 0.3 gm per 1 kg of body weight of said animal of a complex salt of thiodiphenylamine cupric chloride of the formula:



4,016,273
SUSTAINED RELEASE FORMS OF CERTAIN OXAZEPINES FOR PARENTERAL ADMINISTRATION

George Madison Sieger, Montvale, N.J.; James Elwood Krueger, New City; Arnold Curtis Osterberg, Pearl River, both of N.Y., and David Henry Tedeschi, Little Falls, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed July 16, 1975, Ser. No. 596,488
Int. Cl.² A11K *31/495*
U.S. Cl. 424—250 8 Claims

6. A method of treating central nervous system disorders in a warm-blooded animal which comprises parenterally administering to said animal a therapeutically effective amount of a pharmaceutical composition for parenteral administration containing as the main active ingredient therein at a concentration of about 50 mg./ml. to about 400 mg./ml. the pamoate salt of 2-chloro-11-(1-piperazinyl)dibenz[b,f][1,4]oxazepine or the pamoate salt of 2-chloro-11-(4-methyl-1-piperazinyl)-dibenz[b,f][1,4]oxazepine, in an injectable oil and a gelling agent at a concentration of about 10 mg/ml.

7. A method according to claim **6** wherein the main active ingredient is 2-chloro-11-(4-methyl-1-piperazinyl)-dibenz[b,f][1,4]oxazepine pamoate, the injectable oil is sesame oil and the gelling agent is aluminum monostearate.

4,016,274

NAPHTHYRIDINE DERIVATIVES

Claude Cotrel, Paris; Cornel Crisan, Sceaux; Claude Jeanmart, Brunoy (Essonne), and Mayer Naoum Messer, Bievres (Essone), all of France, assignors to Rhone-Poulenc S.A., Paris, France

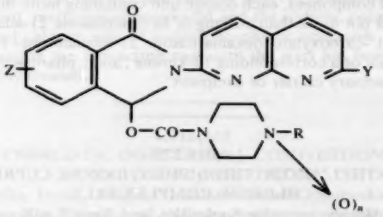
Continuation-in-part of Ser. No. 469,431, May 13, 1974, abandoned. This application Oct. 17, 1975, Ser. No. 623,359

Claims priority, application France, May 15, 1973, 73.17516; Mar. 14, 1974, 74.08728; Mar. 14, 1974, 74.08730

Int. Cl.² C07D *401/14*

U.S. Cl. 424—250 29 Claims

1. A naphthyridine derivative of the formula:



wherein Y represents hydrogen, halogen, alkyl of 1 through 4 carbon atoms, alkoxy of 1 through 4 carbon atoms, or cyano, Z represents hydrogen, halogen, alkoxy of 1 through 4 carbon atoms, nitro or trifluoromethyl, and n represents zero and R represents hydrogen, alkyl of 1 through 4 carbon atoms, alkenyl of 2 through 4 carbon atoms, alkynyl of 2 through 4 carbon atoms or hydroxyalkyl of 1 through 4 carbon atoms, or phenyl, or n represents 1 and R represents alkyl of 1 through 4 carbon atoms or hydroxyalkyl of 1 through 4 carbon atoms, and non-toxic pharmaceutically acceptable acid addition salts thereof.

4,016,275

INSECTICIDAL HYDROCARBYL SULFENYLMERCAPTO PYRIMIDINES

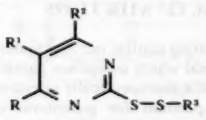
Joseph E. Moore, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 461,578, April 17, 1974, Pat. No. 3,896,225, which is a division of Ser. No. 201,185, Nov. 22, 1971, Pat. No. 3,821,222. This application July 3, 1975, Ser. No. 592,831

Int. Cl.² A01N *9/00*; C07D *239/22*

U.S. Cl. 424—251 4 Claims

1. A method of killing insects which comprises contacting pre-adult insects with a metamorphosis-inhibiting amount of a compound of the formula



wherein R, R^1 and R^2 are individually hydrogen, halogen of atomic number 9 to 35, hydroxy, alkyl of 1 to 6 carbon atoms substituted with 0 to 4 halogen atoms of atomic number 9 to 35 or alkenyl of 2 to 6 carbon atoms substituted with 0 to 4 halogen atoms of atomic number 9 to 35, R^3 is haloalkyl or haloalkenyl of up to 10 to carbon atoms substituted with 1 to 5 halogen atoms of atomic number 9 to 35 or phenyl substituted with 0 to 2 halogen atoms of atomic number 9 to 35 or alkyl groups of 1 to 4 carbon atoms.

4,016,276

TREATMENT OF LIVER DYSFUNCTION WITH 2-AMINO-6-BENZYL-3-ETHOXYCARBONYL-4,5,6,7-TETRAHYDRO-THIENO[2,3-C]PYRIDINE HYDROCHLORIDE

Toshihiro Kobayakawa, Yoshitomi; Hiroshi Yasuda, Nakatsu; Kazuhiro Goto, Nakatsu, and Michio Nakanishi, Nakatsu, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

Filed Apr. 17, 1975, Ser. No. 569,118

Int. Cl.² A61K *31/435*

U.S. Cl. 424—256 3 Claims

1. A method for the treatment of liver dysfunction in mammals which comprises administering to said mammals an effective amount of 2-amino-6-benzyl-3-ethoxycarbonyl-4,5,6,7-tetrahydro-thieno-[2,3-c]pyridine hydrochloride.

4,016,277

4-QUINOLINE AND 4-ISOQUINOLINE DERIVATIVES OF 2,6-DIAMINO-1,4-DIHYDROPYRIDINE

Horst Meyer, Wuppertal; Friedrich Bossert, Wuppertal-Elberfeld; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

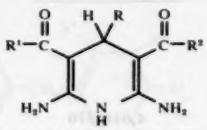
Division of Ser. Nos. 454,996, March 27, 1974, Pat. No. 3,950,336, and Ser. No. 445,258, March 27, 1974, Pat. No. 3,905,747, each is a division of Ser. No. 336,483, Feb. 28, 1973, Pat. No. 3,855,231. This application Feb. 28, 1975, Ser. No. 554,135

Claims priority, application Germany, Mar. 6, 1972, 2210687

Int. Cl.² A61K *31/47*

U.S. Cl. 424—258 8 Claims

1. A pharmaceutical composition useful for effecting coronary vessel dilation and treating hypertension in humans and animals which comprises a coronary vessel dilating amount or an antihypertensive amount of a compound of the formula:



wherein

R is quinolyl or isoquinolyl, unsubstituted or substituted by one or two members selected from the group consisting of lower alkyl, lower alkoxy and halogeno; and

each of R^1 and R^2, taken independently of the other, is lower alkoxy, lower alkoxy(lower alkoxy), alkenyloxy of 2 to 4 carbon atoms, alkynyloxy of 2 to 4 carbon atoms, amino, lower alkylamino or di(lower alkyl)amino.

in combination with a pharmaceutically acceptable non-toxic inert diluent or carrier.

4,016,278

PESTICIDAL CARBAMATES

Richard C. Koch, Niantic, Conn., and Hugh C. Richards, Canterbury, England, assignors to Pfizer Inc., New York, N.Y.

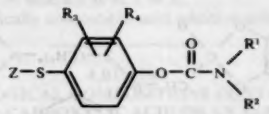
Filed July 14, 1975, Ser. No. 595,535

Claims priority, application United Kingdom, July 17, 1974, 31612/74

Int. Cl.² A01N *9/22*

U.S. Cl. 424—263 10 Claims

1. A compound of the formula



wherein R^1 is alkyl having from one to five carbon atoms;
R^2 is selected from the group consisting of hydrogen, alkyl having from one to five carbon atoms, alkanoyl having from two to five carbon atoms and chloroacetyl;
R^3 and R^4 are each selected from the group consisting of hydrogen and alkyl having from one to five carbon atoms;
and Z is selected from the group consisting of 2-pyridyl, 3-pyridyl and 4-pyridyl.

4,016,279

SPRAY COMPOSITIONS FOR INHALATION THERAPY OF BRONCHIAL DISORDERS

Rudolf Bauer, Wiesbaden, and Helmut Wick, Ingelheim, both of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation-in-part of Ser. No. 487,054, July 10, 1974, abandoned, which is a continuation-in-part of Ser. No. 271,558, July 13, 1972, abandoned. This application Jan. 13, 1976, Ser. No. 648,729

Claims priority, application Germany, July 13, 1971, 2134899

Int. Cl.² A61L *9/04*; **A61K** *9/14*, *31/46*

U.S. Cl. 424—265 **4 Claims**

1. An inhalation spray composition for treating bronchial disorders, consisting essentially of a pharmaceutically inert liquid carrier and 0.007 to 1% by weight, based on the total weight, of N-ethyl-norscopolamine methobromide or N-methyl-scopolammonium bromide.

4,016,280

4,4-DIARYLPIPERIDINE COMPOSITIONS AND USE

Heinz Günter Menge, Constance, and Josef Klosa, Berlin, both of Germany, assignors to Byk Gulden Lomberg Chemische Fabrik GmbH, Germany

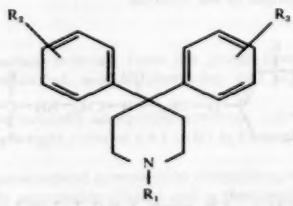
Division of Ser. No. 455,041, March 26, 1974, which is a continuation-in-part of Ser. No. 55,957, July 17, 1970, abandoned. This application May 13, 1975, Ser. No. 576,973

Claims priority, application Germany, July 17, 1969, 1936452

Int. Cl.² A61K *31/445*

U.S. Cl. 424—267 **25 Claims**

1. A neuroleptic or CNS-stimulating medicament composition in dosage form wich contains, as a pharmacologically-active component thereof, an effective concentration of at least one physiologically-acceptable 4,4-diarylpiperidine in admixture with a pharmaceutically-acceptable carrier, and in which at least one physiologically-acceptable 4,4-diarylpiperidine is a member selected from the group consisting of (a) a compound of the formula



wherein

R_1 is a member selected from the group consisting of —H, alkyl with from 1 to 6 carbon atoms, inclusive, nuclearly-substituted or unsubstituted phen(lower)alkyl, hydroxy(lower)alkyl, (lower)alkyloxo(lower)alkyl, (lower)alkoxy(lower)alkyl, nuclearly-substituted or unsubstituted phenoxy(lower)alkyl, nuclearly-substituted or unsubstituted phenyl(lower)alkoxy(lower)alkyl and nucearly-substituted or unsubstituted phenyloxo(lower)alkyl; each occurrence of "lower" denoting a carbon skeleton having from 1 to 4 carbon atoms, inclusive; and any substituent of a nuclearly-substituted benzene ring being an atom of a halogen having an atomic number from 9 to 35, inclusive; and

each of R_2 and R_3 is, independently, a member selected from the group consisting of —H and alkyl having from 1 to 4 carbon atoms, inclusive;

and (b) an acid-addition salt of (a).

4,016,281

TETRALONE AND INDANONE COMPOUNDS

Rochus Jonas; Jürgen Uhl; Helmut Müller-Calgan, and Klaus Irmscher, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

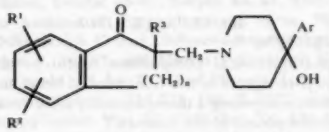
Filed Feb. 18, 1976, Ser. No. 659,132

Claims priority, application Germany, Feb. 22, 1975, 2507782; Dec. 13, 1975, 2556196

Int. Cl.² C07D *211/52*

U.S. Cl. 424—267 **29 Claims**

1. A tetralone or indanone compound of the formula



wherein R^1 is H, OH, alkoxy of 1–4 carbon atoms, cycloalkoxy of 3–6 carbon atoms, F, Cl, Br, NO_2, NH_2, monoalkylamino or dialkylamino, wherein the alkyl each are of 1–4 carbon atoms, alkanoyloxy of 1–6 carbon atoms or alkanoylamino of 1–4 carbon atoms; R^2 is H, OH, or alkoxy of 1–4 carbon atoms or R^1 and R^2 collectively are methylenedioxy; R^3 is H or CH_3; Ar is phenyl or phenyl substituted by up to 5 of alkyl or alkoxy of 1–4 carbon atoms, F, Cl, Br, or CF_3; n is 1 or 2, and pharmaceutically-acceptable acid addition salts thereof.

4,016,282

UREIDOACETAMIDO-PENICILLINS

Hans-Bodo König; Wilfried Schröck, both of Wuppertal-Elberfeld; Hans Disselnkötter, Cologne, and Karl Georg Metzer, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

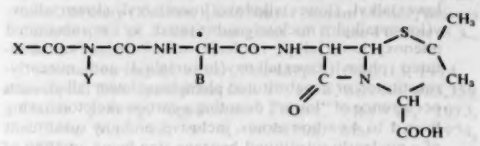
Division of Ser. No. 425,966, Dec. 19, 1973, Pat. No. 3,959,258, which is a division of Ser. Nos. 145,809, May 21, 1971, abandoned, and Ser. No. 145,877, May 21, 1971, abandoned. This application Apr. 16, 1975, Ser. No. 568,384

Claims priority, application Germany, May 25, 1970, 2025414; May 25, 1970, 2025415

Int. Cl.² A61K *31/43*

U.S. Cl. 424—271 **31 Claims**

1. A pharmaceutical composition for treating bacterial infections comprising an antibacterially effective amount of a penicillin of the formula:



wherein

the carbon atom designated by * constitutes a center of chirality;

X is hydrogen, lowr alkyl, monohalo(lower alkyl), dihalo (lower alkyl), trihalo(lower alkyl), lower alkoxy, or cyclohexyloxy;

Y is lower alkyl; and

B is phenyl or phenyl substituted by lower alkyl, lower alkoxy, monohalo, dihalo, or lower alkylthio;

or a pharmaceuticaly acceptable nontoxic salt thereof, in combination with a pharmaceutically acceptable nontoxic, inert diluent or carrier.

4,016,283

COMPOSITION AND METHOD FOR TREATMENT OF HEART AND CIRCULATORY AILMENTS

Knut A. Jaeggi, Basel; Franz Ostermayer, Riehen, and Herbert Schröter, Fullinsdorf, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

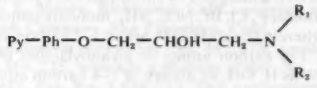
Division of Ser. No. 447,118, Feb. 28, 1974, Pat. No. 3,984,436. This application Nov. 24, 1975, Ser. No. 634,809

Claims priority, application Switzerland, Mar. 9, 1973, 3518/75

Int. Cl.² A61K *31/40*

U.S. Cl. 424—274 **2 Claims**

1. A pharmaceutical composition useful as blockers of adrenergic β-receptors in the treatment of heart and circulatory ailments comprising a therapeutically effective amount of a pyrrolyl compound of the formula I



wherein Py is 1-pyrrolyl or mono- or di lower alkylated 1pyrrolyl, Ph is phenylene, R_1 is hydrogen or lower alkyl and R_2 is hydrogen, lower alkyl, phenyl-lower alkyl having up to 10 carbon atoms wherein the phenyl ring is unsubstituted or monosubstituted by lower alkyl, lower alkoxy, halogen or trifluoromethyl, or R_1 and R_2 together are lower alkylene, their antipodes or salts, together with a pharmaceutical excipient.

4,016,284

DERIVATIVES OF 1,3-BENZODIOXOLE, THE PREPARATION AND USE THEREOF

Pierre M. Vanhoof, and Pierre M. Clarebout, both of Brussels, Belgium, assignors to A. Christiaens Societe Anonyme, Brussels, Belgium

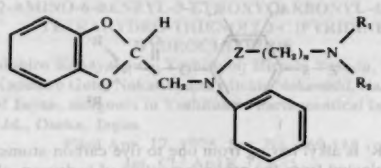
Filed Dec. 17, 1974, Ser. No. 533,558

Claims priority, application United Kingdom, Dec. 17, 1973, 58292/73

Int. Cl.² A61K *31/36*

U.S. Cl. 424—282 **5 Claims**

1. Derivatives of 1,3-benzodioxole of the following general formula:



in which Z represents $—CH_2—$, R_1 and R_2 which may be identical or different represent each a lower alkyl group containing 1 to 4 carbon atoms, and R_1 may also represent hydrogen, n is equal to 1 or 2 and the pharmaceutically acceptble acid addition salts thereof.

5. A pharmaceutical composition for the treatment of heart arrhythmia which comprises as the active ingredient an amount effective to treat heart arrhythmia of a derivative according to claim **1** together with a pharmaceutical excipient.

4,016,285

ACETIC ACID DERIVATIVE HAVING CHOLERETIC AND ANTI-INFLAMMATORY ACTIVITY

Eugene Boschetti, Venissieux; Philippe Briet; Jean-Jacques Berthelon, and Janine Chabert, all of Lyon, all of France, assignors to Lipha, Lyonnaise Industrielle Pharmaceutique, Lyon, France

Filed July 28, 1975, Ser. No. 599,778

Claims priority, application France, Aug. 5, 1974, 74.27067

Int. Cl.² A61K *31/35*

U.S. Cl. 424—283 **5 Claims**

1. A pharmaceutical composition having choleretic and anti-inflammatory activity, comprising per dosage unit as an essential active ingredient from about 100 mg to about **2** g of α-[6-(2-phenyl)-chromonyl]-acetic acid or an alkali metal salt thereof, in association with a pharmaceutically acceptable carrier or excipient therefor.

4,016,286

PHARMACEUTICAL COMPOSITIONS CONTAINING A 1-PHENOXY-2-HYDROXY-3-ALKYNYLAMINO-PROPANE AND THEIR USE AS ADRENOLYTICS AND HYPOTENSIVES

Herbert Köppe; Werner Kummer; Helmut Stähle, and Gojko Muacevic, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

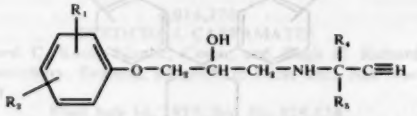
Division of Ser. No. 444,713, Feb. 22, 1974, Pat. No. 3,925,446. This application Sept. 23, 1975, Ser. No. 615,913

Claims priority, application Germany, Feb. 28, 1973, 2309887; Jan. 26, 1974, 2403809

Int. Cl.² A61K *31/135*

U.S. Cl. 424—304 **12 Claims**

1. A pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective adrenolytic or hypotensive amount of a racemic or optically active compound of the formula



wherein

R_1 is $—(CH_2)_X—CN$, where X is 0, 1, 2 or 3,

R_2 is hydrogen, halogen or —NH—CO—NHR, where R is lower alkyl,

R_4 is alkyl of 1 to 3 carbon atoms, and

R_5 is alkyl of 1 to 3 carbon atoms or, together with R_4, $-(CH_2)_p-$ where p is 4, 5 or 6,

or a physiologically compatible acid addition salt thereof.

4,016,287
DERMATOLOGICAL COMPOSITIONS CONTAINING AN ACYLAMINO-CARBOXYLIC ACID OR AN ALKYL ESTER THEREOF

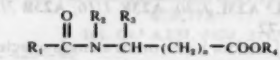
Hans Eberhardt, and Rolf Stefan Brickl, both of Biberach an der Riss, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation-in-part of Ser. No. 379,751, July 16, 1973, abandoned. This application July 17, 1975, Ser. No. 596,852

Int. Cl.² A61K *31/24*

U.S. Cl. 424—309 **6 Claims**

1. A method of inhibiting the sebaceous gland execretion and combatting inflammations of the skin, which comprises topically applying to the skin an effective amount of a composition consisting essentially of an inert dermatological carrier and from 0.1 to 20% by weight, based on the total weight, of a compound of the formula



wherein

R_1 is hydrogen, alkyl of 1 to 3 carbon atoms, trifluoromethyl, phenyl, halo-phenyl, nitro-phenyl or biphenylyl,

R_2 is hydrogen, alkyl of 1 to 3 carbon atoms or phenyl,

R_3 is hydrogen, alkyl of 1 to 6 carbon atoms, methylthioethyl or benzyl,

R_4 is alkyl of 10 to 22 carbon atoms or, when R_1 is biphenylyl, also hydrogen, and

n is 0, 1 or 2.

4,016,288
COMPOSITIONS AND METHOD OF TREATING HYPERTENSION

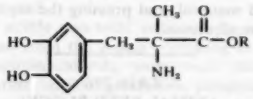
Alexander Scriabine, Ambler, and Clement A. Stone, Blue Bell, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Aug. 13, 1975, Ser. No. 604,292

Int. Cl.² A61K *31/24, 31/195*

U.S. Cl. 424—309 **15 Claims**

1. A method for lowering blood pressure in an animal which comprises administering to the animal a therapeutically effective amount of a composition containing a compound (A) selected from the group consistisng of L-α-hydrazino-α-loweralkyl-3,4-dihydroxyphenyl propionic acid or α-hydrazino-3,4-dihydroxyphenyl propionic acid and a pharmaceutically acceptable non-toxic salt thereof and a compound (B) having the formula:

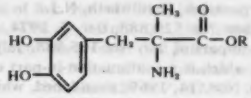


wherein

R is a radical selected from the group consisting of 2-acetamidoethyl, α-pivaloyloxyethyl and α-succinimidoethyl,

or a pharmaceutically acceptable non-toxic salt thereof, and wherein the weight ratio of (A) : (B) is from about 0.05 to about 20.

9. A pharmaceutical composition comprising an inert pharmaceutically acceptable diluent and a therapeutically effective amount of a compound (A) selected from the group consisting of L-α-hydrazino-α-loweralkyl-3,4-dihydroxyphenyl propionic acid or α-hydrazino-3,4-dihydroxyphenyl propionic acid and a pharmaceutically acceptable non-toxic salt thereof and a compound (B) having the formula:



wherein

R is a radical selected from the group consisting of 2-acetamidoethyl, α-pivaloyloxyethyl and α-succinimidoethyl,

or a pharmaceutically acceptable non-toxic salt thereof, and wherein the weight ratio of (A) : (B) is from about 0.05 to about 20.

4,016,289
MEDICINAL PREPARATION FOR TREATMENT OF VIRAL-ETIOLOGY DISEASES

Grigory Nikolaevich Pershin, Novopeschanaya ulitsa, 19/10, kv. 75; Nadezhda Sergeevna Bogdanova, ulitsa 26 Bakinskikh Komissarov, 1, korpus 1, kv. 26; Irina Sergeevna Nikolaeva, Matveevskaya ulitsa, 1, kv. 179; Jury Fedorovich Maichuk, ulitsa Usievicha, 11, kv. 4; Roza Isaakovna Abramishvili, ulitsa Narodnogo opolchenia, 11, kv. 27; Teshabai Nazarovich Avazov, Sadovo-Chernogryazskaya ulitsa, 14/19, kv. 1; Galina Yakovlevna Uretskaya, Belyaevo-Bogorodskoe, kvartal 46-47, korpus 40, kv. 170; Svetlana Jurievna Anikina, B. Serpukhovskaya ulitsa, 70, kv. 5; Alexei Nikolaevich Grinev, Belyaevo-Bogorodskoe, kvartal 44, korpus 9, kv. 57, and Maxim Yakovlevich Kraft, Leninsky prospekt, 93, kv. 29, all of Moscow, U.S.S.R.

Continuation of Ser. No. 224,271, Feb. 7, 1972, abandoned. This application May 27, 1975, Ser. No. 581,413

Int. Cl.² A61K *31/185, 31/11, 31/12*

U.S. Cl. 424—315 **15 Claims**

1. A medicinal preparation for the treatment of virus-caused eye and skin diseases, said preparation containing an amount effective against said virus of the bisulfite compound of 2-fluorenonyl-glyoxal in combination with an unctuous base.

4,016,290
METHOD OF ENCAPSULATING POLYAMINOPOLYCARBOXYLIC ACID CHELATING AGENTS IN LIPOSOMES

Yueh Erh Rahman, Downers Grove, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Division of Ser. No. 415,077, Nov. 12, 1973, Pat. No. 3,932,657. This application Nov. 10, 1975, Ser. No. 630,474

Int. Cl.² A61K *31/195, 31/685, 47/00*

U.S. Cl. 424—319 **4 Claims**

1. A method of encapsulating a polyaminopolycarboxylic acid chelating agent within liposomes comprising: drying a lipid mixture to form a thin film; wetting the lipid film with a solution containing the polyaminopolycarboxylic acid chelating agent; mixing the solution and the wetted lipid film to form a suspension of liposomes encapsulating said chelating agent; and separating said liposomes.

4,016,291

BENZENESULFONYL UREA COMPOUNDS AND THEIR THERAPEUTIC USE

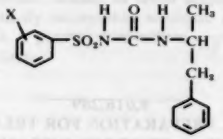
Lester Zitowitz, West Orange; Lewis A. Walter, Madison, and Arnold J. Wohl, North Caldwell, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 529,888, Dec. 5, 1974, which is a continuation-in-part of Ser. No. 165,588, July 23, 1971, abandoned, which is a continuation-in-part of Ser. No. 877,000, Nov. 14, 1969, abandoned, which is a continuation-in-part of Ser. No. 853,504, Aug. 27, 1969, abandoned. This application Mar. 15, 1976, Ser. No. 667,243

Int. Cl.² C07C *127/16*

U.S. Cl. 424—322 **8 Claims**

1. A method for the prevention and reversal of the symptoms of angina pectoris which comprises administering a therapeutically effective quantity of a compound of the formula



and the salts thereof formed with pharmaceutically acceptable bases, wherein X is methyl.

4,016,292

PROCESS FOR IMPROVING THE COLOR STABILITY OF FRESH MEAT

David Edward Hood, 13 Taney Rd., Dundrum, Dublin 14, Ireland

Filed Sept. 3, 1974, Ser. No. 502,862

Int. Cl.² A23L *1/31*

U.S. Cl. 426—2 **7 Claims**

1. A process for improving the color stability of fresh meat which is to be sold as prepackaged cuts, characterized in that it comprises the steps of injecting into the vascular system of a living animal from which said meat is to be taken a dose of ascorbic acid or a salt thereof in the range of 0.25g. to 1.25g. per kg. liveweight of the animal, holding the animal for a time sufficient to attain distribution of the ascorbic acid or salt thereof through the muscle tissues, and then slaughtering the animal under bacteriologically clean conditions, whereby the the color of the meat remains stable for 6–7 days under refrigerated conditions.

4,016,293

METHOD OF CARRYING OUT ENZYME CATALYZED REACTIONS

Robert W. Coughlin, 902 Seventh Ave., Bethlehem, Pa. 18018, and Marvin Charles, 622 N. 29 St., Allentown, Pa. 18104

Continuation-in-part of Ser. No. 228,748, Feb. 23, 1972, Pat. No. 3,928,143. This application Feb. 11, 1974, Ser. No. 441,569

Int. Cl.² C12D *13/02*

U.S. Cl. 426—42 **14 Claims**

1. An improved method of effecting enzymatic reactions in a reactant material which is contained in a carrier fluid by passing the carrier fluid past enzyme material attached by adsorption to a supporting material comprising:

a. passing the carrier fluid generally upwardly through a reaction zone containing finely divided particles of supporting material having a size range of about 0.01 millimeters to 5 millimeters and a density of from about 2.4 to 25 grams/cm³ to which the enzyme material is attached by adsorption, the volume of the reaction zone being sufficient to contain all of the particulate supporting material in at least an expanded condition wherein the various particles are substantially not supported upon each other,

b. maintaining an upward velocity of carrier fluid through said reaction zone sufficient to suspend and agitate the said particulate supporting material, but insufficient to carry said particulate supporting material from said reaction zone.

4,016,294

ANIMAL FEEDS FOR HERBIVOROUS DOMESTIC ANIMALS

Elmer F. Glabe, Northbrook; Perry W. Anderson, Niles, and Stergios Laftsidis, Chicago, all of Ill., assignors to Food Technology Products, Chicago, Ill.

Division of Ser. No. 484,080, June 28, 1974, Pat. No. 3,925,559, and a continuation-in-part of Ser. No. 300,736, Oct. 25, 1972, abandoned, which is a continuation-in-part of Ser. No. 158,616, June 30, 1971, abandoned. This application Sept. 15, 1975, Ser. No. 613,068

The portion of the term of this patent subsequent to Dec. 9, 1992, has been disclaimed.

Int. Cl.² A23L *1/30;* A23K *1/16;* A23B *7/14*

U.S. Cl. 426—72 **4 Claims**

1. An animal feed for herbivorous animals selected from the group consisting of cattle, pigs, horses, sheep, goats and fowl containing sodium diacetate added thereto in sufficient amount to serve as an attractant and to enhance the taste threshhold of said feed, the amount of sodium diacetate being within the range of 0.1% to 1.5% by weight of the total feed, and said feed to which said sodium diacetate is added being selected from the group consisting of corn and mixed feeds containing at least 25% by weight of corn wherein said sodium diacetate is present in the endosperm of the corn.

4,016,295

PROTEINACEOUS FOOD PRODUCT

Ian Edward Burrows, Gaddesby, and Peter Arthur Cheney, Mountsorrell, England, assignors to Pedigree Petfoods Limited, Melton Mowbray, England

Filed Oct. 17, 1974, Ser. No. 515,674

Claims priority, application United Kingdom, Oct. 18, 1973, 48665/73

Int. Cl.² A23B *4/12*

U.S. Cl. 426—43 **8 Claims**

1. A method of making an edible proteinaceous food product comprising the steps of:

fermenting carbohydrate in the presence of animal-derived proteinaceous material to produce acid;

adding the fermented material to a colloidal solution of a another protein, the said fermentation having been continued sufficiently to acidify and thereby precipitate said other protein in the form of a curd that entraps and binds the fermented material; separating off said curd and entrapped material; and pressing the separated material into a compact mass.

4,016,296

ANIMAL FEED BLOCK

Stanislao A. DeSantis, Rolling Hills, Calif., assignor to Milo Don Appleman, Los Angeles, Calif., a part interest

Filed Mar. 18, 1976, Ser. No. 668,225

Int. Cl.² A23K *1/22*

U.S. Cl. 426—69 **14 Claims**

1. An animal feed block comprising:

about 25 to about 75% by wt. of molasses;

about 0.5 to about 5% by wt. of water absorbent clay;

about 0.2 to about 3% by wt. of water binding agent;

about 0.5 to about 10% by wt. of hard soap; and

a member selected from the group consisting of natural protein source in an amount from about 5 to about 35% by wt., non-protein nitrogen source in an amount from

about 2 to about 10% by wt., phosphorous source in an amout from about 0.5 to about 7% by weight calculated as phosphorous, fatty acid in an amount from about 1 to about 10% by wt., fat in an amount from about 1 to about 5% by wt., and mixtures thereof to make up 100% by weight of said feed block.

4,016,297

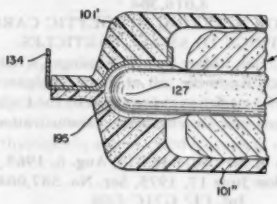
ELECTRICALLY CONDUCTING FOODSTUFF COATED WITH COMPOSITION OF MATTER CONSISTING ESSENTIALLY OF GEL AND IONIZED SPECIES

Ernst Theodore Theimer, Rumson, and George E. Heinze, East Brunswick, both of N.J., assignors to Lectrofood, Inc., East Brunswick, N.J.

Continuation-in-part of Ser. No. 446,822, Feb. 28, 1974, Pat. No. 3,966,972. This application Apr. 12, 1976, Ser. No. 675,773

Int. Cl.² A23L *1/04, 3/32*

U.S. Cl. 426—90 **9 Claims**



1. An electrically high conducting food substance comprising:

a. Substantially diametrically opposite high conducting ends;

b. Each end having a substantially solid surface;

c. At least two electrical contacts located at said substantially diametrically opposite ends of said food substance and in contact with each of said substantially solid surfaces; and

d. At least a substantial portion of each of said substantially solid surfaces having in intimate contact therewith and as an integral part of each of said solid surfaces a composition forming a continuous phase and consisting essentially of:

i. A gel selected from the group consisting of agar, xanthan gum, tragacanth, guar gum, gum arabic and algin gum; and

ii. An edible non-toxic substantially ionized species selected from the group consisting of sodium chloride, potassium chloride, ammonium chloride, magnesium chloride, sodium glutamate, potassium glutamate, sodium alginate, potassium alginate, ammonium alginate, magnesium alginate, calcium alginate, sodium bicarbonate, potassium bicarbonate, magnesium bicarbonate, and calcium bicarbonate

wherein the weight ratio of gel to substantially ionized species is from about 1:20 up to about 20:1, said composition also being positioned to make full intimate contact between the electrically high conducting food substances and the electrical contacts whereby the contact is rendered non-arcing when an electromotive force is applied to said electrical contacts, the ratio of the surface area of said food substance coated with said composition of gel and substantially ionized species to the surface area of said food substance not coated with said composition being in the range of from 1:50 up to 1:4.

4,016,298

CHEESE EXTENDER

Robert L. Kasik, Berwyn, and Marvin A. Peterson, Park Ridge, both of Ill., assignors to Beatrice Foods Co., Chicago, Ill.

Division of Ser. No. 455,510, March 27, 1974, Pat. No. 3,917,854. This application Oct. 20, 1975, Ser. No. 624,261

The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.

Int. Cl.² 426 *657*; A23C *19/12*

U.S. Cl. 426—94 **21 Claims**

1. A food composition which normally contains cheese and the inclusion thereof as a cheese substitute congealed mixture of: essentially magnesium neutralized casein or potassium neutralized casein or a mixture of magnesium and potassium neutralized casein; a fat having a melting point of 130° F. or less; and water; wherein the weight ratio of the neutralized casein-to-fat is from 1:2 to 2:1 and the weight ratio of water to the combination of neutralized casein and fat is from 1:2 to 3:1.

4,016,299

PROCESS OF COATING FOOD WITH PARTICULATE MATERIAL

Raymond E. Booth, Sandusky, Ohio, assignor to Sam Stein Associates, Inc., Sandusky, Ohio

Continuation-in-part of Ser. No. 544,323, Jan. 27, 1975, Pat. No. 3,967,583. This application Dec. 12, 1975, Ser. No. 640,235

Int. Cl.² A23L *1/00*

U.S. Cl. 426—293 **3 Claims**

1. The method of coating a food product with a finely divided particulate coating material comprising the steps of (1) providing a liquid coating on the food product; (2) providing a flow of said coating material to a moving belt which provides a product path centrally thereof; (3) splitting said flow and providing a bed of said material of predetermined thickness on a central portion of said product path while diverting parts of said material flow laterally on both sides of said central portion; (4) placing a food product on said central portion; (5) advancing said product and said coatingmaterial down said path; (6) moving said laterally diverted parts of material flow laterally inwardly on top of said food product; (7) discharging said coated product at the end of said path.

4,016,300

METHOD OF HEATING MICROBIAL CELLS

Philip M. Arnold, and Emil A. Malick, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 4, 1975, Ser. No. 637,510

Int. Cl.² A23J *3/00, 1/18*

U.S. Cl. 426—429 **8 Claims**

1. A process for reducing the water content of a dispersion of microorganisms in an aqueous medium, said process comprising the steps of:

a. contacting a dispersion of microbial cells in an aqueous medium with a heating medium containing at least one hydrocarbon selected from a group comprising C_5-C_8 hydrocarbons at a temperature at least about 100° C for a time sufficient to dewater said cells to a water content of less than about 13 percent by weight; and

b. separating the heating medium from the microbial cells.

4,016,301
ELECTRICALLY CONDUCTIBLE GELLABLE COMPOSITION WITH IONIZED SALT

Ernst Theodore Theimer, Rumson, and George E. Heinze, East Brunswick, both of N.J., assignors to Lectrofood, Inc., East Brunswick, N.J.

Continuation-in-part of Ser. No. 446,822, Feb. 28, 1974, Pat. No. 3,966,972. This application Apr. 12, 1976, Ser. No. 676,392

Int. Cl.² A23L *1/04*

U.S. Cl. 426—573 **3 Claims**

1. An edible electrically high conducting composition which forms a continuous phase on setting, consisting initially of:

i. From 86 up to 99.3 weight percent water;

ii. From 0.5% up to 4.0% by weight of a material selected from the group consisting of agar, xanthan gum, tragacanth, guar gum, gum arabic and algin gum;

iii. From 0.2% up to 10.0% by weight of an edible ionized species selected from the group consisting of sodium chloride, potassium chloride, ammonium chloride, magnesium chloride, sodium glutamate, potassium glutamate, calcium glutamate, magnesium glutamate, sodium alginate, potassium alginate, calcium alginate and magnesium alginate, sodium bicarbonate, potassium bicarbonate, magnesium bicarbonate and calcium bicarbonate.

4,016,302
MARGARINE FAT BLEND

Hans Robert Kattenberg, and Cornelis Poot, both of Vlaardingen, Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 433,953, Jan. 16, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 610,957

Int. Cl.² A23D *5/00*

U.S. Cl. 426—607 **3 Claims**

1. A fat blend containing 30–80 percent of a palm-based fat selected from the group consisting of hydrogenated palm oil, unhydrogenated palm oil and the solid and liquid fractions thereof, 15–85 percent of said palm-based fat is co-randomized with one or more non-palm-based fats and liquids oils of which at least 90% of the triglycerides contain fatty acids of a mean chain length of 44/3 and higher, to provide 25–98 percent of co-randomized constituents in the fat blend, the fat blend having a ratio of 1,3-dipalmitoyl-2-cis-mono- and polyunsaturated fatty acid triglycerides to 1,2-dipalmitoyl-3-cis-mono- and polyunsaturated fatty acid triglycerides of less than 2.8, the content of fatty acid triglycerides having three saturated fatty acids of a mean chain length of 44/3 or higher being greater than the content of dipalmitoyl-cis-mono- and polyunsaturated fatty acid triglycerides minus eight percent.

4,016,303
METHOD OF FLOCKING BLOOD-CONTACTING SURFACES ON ARTIFICIAL IMPLANT DEVICES

Victor L. Poirier, Chelmsford, and John T. Keiser, Acton, both of Mass., assignors to The United States of America, Washington, D.C.

Filed Aug. 6, 1975, Ser. No. 602,385

Int. Cl.² A61K *5/00*; **B05D** *1/14*, *1/16*; **A61F** *1/00*

U.S. Cl. 427—2 **9 Claims**

1. In a method for the manufacture of an artificial implant device adapted to be implanted in blood-contacting position in the body of a living creature such as a human being, said method including the steps of flocking the bloodcontacting surface of said device with fibers of a bloodcompatible polymeric material by first applying to said surface a coating of blood-compatible adhesive material and thereafter applying said fibers to the adhesive-coated surface so as to adhesively secure said fibers to said surface, the improvement whereby the bonds between said fibers and said surface are strengthened and said fibers are interlocked with each other so as to substantially reduce the possibility of fiber separation and release from said surface when said device is in implanted position, comprising the steps of applying to said flocked surface a dilute solution of said adhesive material in a solvent therefor whereby said adhesive material is preferentially attracted by capillary action to the points of contact of said

fibers with each other and with said surface, the content of said adhesive material in said solution being sufficient to coat said fibers only at said points of contact, and thereafter evaporating said solvent from said surface to thereby form secondary bonds of said adhesive material at said points of contact and leave said fibers otherwise uncoated.

4,016,304
METHOD FOR APPLYING PYROLYTIC CARBON COATINGS TO SMALL PARTICLES

Ronald L. Beatty, Oak Ridge; Dale V. Kiplinger, Concord, and Bill R. Chilcoat, Knoxville, all of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Continuation of Ser. No. 848,078, Aug. 6, 1969. This application June 17, 1975, Ser. No. 587,004

Int. Cl.² G21C *3/06*

U.S. Cl. 427—6 **3 Claims**

1. An improved pyrolytic carbon coating process which comprises fluidizing a mass of particles composed of an oxide, carbide, or nitride of a metal selected from the group consisting of thorium, uranium and plutonium or composed of a compound of a metal selected from the group consisting of titanium, zirconium and hafnium a minor proportion of which contains paticles having a density in the range 1-3 grams/cc and the balance consisting of particles which have a diameter two to six times larger than, and a density at least twice that of the particles in said minor proportion, depositing a pyrolytic carbon coating on said fluidized mass of particles and then separating the smaller, less dense coated particles from the larger, denser, coated particles.

4,016,305
VACUUM DEPOSITION METHOD

Yukimasa Wakabayashi, Toda, and Shigeru Takahashi, Tokyo, both of Japan, assignors to Fujikura Kasei Co., Ltd., Tokyo, Japan

Filed Aug. 12, 1975, Ser. No. 604,044

Claims priority, application Japan, Aug. 16, 1974, 49-93208

Int. Cl.² B05D *1/38*; **C23C** *13/02*, *13/04*

U.S. Cl. 427—42 **18 Claims**

1. A method for vacuum deposition which comprises coating on the surface of a substrate to be metallized an undercoating composition comprising a hydroxy-containing vinyl polymer having a hydroxyl number of 20 to 200 and 1.1 to 5.0 equivalents, per equivalent of the hydroxyl group in the vinyl polymer, of a polyisocyanate as a filmforming component, curing the coated film, and depositing a metal or its compound on the undercoat in vacuum to form a metallic layer on said undercoat.

4,016,306

PROCESS FOR FORMING A COATED FILM IN WATER

Norio Miyagawa; Mitsuo Sato; Juichi Kobayashi, and Takashi Kobayashi, all of Nagoya, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed July 3, 1975, Ser. No. 592,893

Claims priority, application Japan, July 15, 1974, 48-81529; July 15, 1974, 48-81530

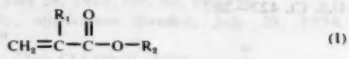
Int. Cl.² B05D *3/06*

U.S. Cl. 427—54 5 Claims

1. A process for forming a coated film which comprises:

coating a substrate with an acrylic resin composition, which is curable upon irradiation by active rays, comprising a photopolymerization initiator and a resin component consisting of a combination of

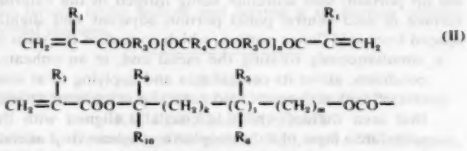
A. an acrylic polymer obtained by polymerization of an acrylic monomer of formula I:



(I)

wherein R_1 represents hydrogen atom or methyl group, R_2 represents hydrogen atom, an unsubstituted or substituted alkyl group, an unsubstituted or substituted cycloalkyl group having 1 to 8 carbon atoms, or an aryl group;

B. an ethylenically unsaturated diacrylate of formula (II) or (III):



(II)

(III)

wherein R_1 is as defined above; R_3 represents a divalent aliphatic or cycloaliphatic hydrocarbon residue having 2 to 10 carbon atoms or a polyalkylene glycol residue having 1 to 10 ether bonds in the molecule; R_4 represents a carboxyl eliminated divalent fatty acid residue having 1 to 20 carbon atoms or an aromatic or an aliphatic hydrocarbon residue; each of R_5, R_6, R_7, and R_8 represents hydrogen atom, a substituted alkyl group having 1 to 8 carbon atoms, a cycloalkyl group or an aryl group; each of R_9, R_{10}, R_{11} and R_{12} represents hydrogen atom, an alkyl group having 1 to 8 carbon atoms, a cycloalkyl group or an aryl group; n represents an integer of 1 to 10; and each of k, l, m, j, p and q represents an integer of 0 to 5; providing the coated layer with a water layer and

subjecting said combined layers to irradiation from a source of active rays to cure the coated film.

4,016,307

METHOD OF SELECTIVELY METALLIZING THE DISPLAY SCREEN OF A CATHODE-RAY TUBE AND CATHODE-RAY TUBE MANUFACTURED BY SAID METHOD

Maria Antonius Alphonsus Andreas Collaris; Antonius Wilhelmus Cornelis van Kemenade; Henricus Antonius Debruijn, and Mathieu Willem Maria Snijders, all of Eindoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 14, 1976, Ser. No. 649,141

Claims priority, application Netherlands, Jan. 20, 1975, 7500616

Int. Cl.² B05D *5/12, 3/06*

U.S. Cl. 427—54 4 Claims

1. A method of selectively metallizing only the phosphor regions of a pattern of phosphor regions and uncovered regions on a window portion of a cathode-ray tube, characterized in that:

a. a photosensitive layer which becomes insoluble in a solvent as a result of exposure to actinic radiation is provided over said pattern,

b. the photosensitive layer is exposed to actinic radiation via the window portion,

c. the photosensitive layer is developed by removing the parts of the layer which have remained soluble from the phosphor regions by means of the solvent,

d. the pattern is treated with a solution containing ions of a metal selected from the group consisting of Pd, Pt, Au, Ag and Cu,

e. the pattern is metallized with a metal selected from the group consisting of Ni, Ag, Co, Sn, Cu and Au in an electroless plating bath,

f. the remaining parts of the photosensitive layer are removed by means of a thermal treatment.

4,016,308

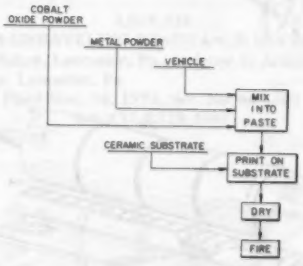
HUMIDITY SENSOR, MATERIAL THEREFOR AND METHOD

Lawrence E. Frazee, Norfolk, Nebr., assignor to Plessey Incorporated, Melville, N.Y.

Filed Apr. 9, 1975, Ser. No. 566,350

Int. Cl.² B05D *5/12*

U.S. Cl. 427—125 5 Claims



1. The method of making a humidity sensor comprising:

forming a screen-printable paste including, on a dry basis, at least 2 wt. % of finely divided cobalt oxide powder and a major proportion of a finely divided precious metal powder plus an organic vehicle;

printing a pattern of said material onto a ceramic substrate in the form of interdigitated fingers;

drying said pattern; and

firing said pattern at a temperature in the range of 1350° to 1550° C. for about 5 to 15 minutes, said oxide diffusing out from printed pattern areas to form a continuous hygroscopic film between said fingers.

4,016,309

METHOD FOR TREATING PRINTED PAPER SHEETS FOR ILLUMINATED DISPLAY

Hirokazu Itoh, Nishi, Japan, assignor to First-Sha Co., Ltd., Nagoya, Japan

Filed Dec. 15, 1975, Ser. No. 640,473
Int. Cl.² G09F *13/04*; B05D *5/00*
U.S. Cl. 427—161 **1 Claim**

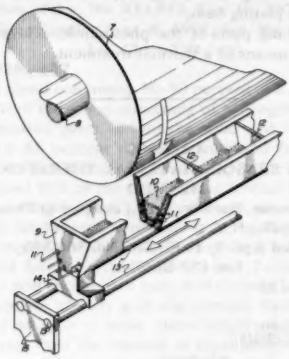
1. A method for displaying light posters, comprising the steps of applying a treating liquid containing 60.0% to 80.0% by weight of liquid parafin, 0.03% to 0.05% by weight of butyl hydroxyanisole and a balance of a diluent for impregnation on back sides of light posters with the same picture images, at an ambient temperature within the range of 5° C to 30° C and at a humidity below 75%, drying said light posters, superposing said posters one on the other, placing said posters on a translucent milky white resin plate, mounting said plate with said posters thereon at the open end of a light box, covering the outer side of said plate with a superposed sheet with a transparent polyvinyl chloride, and, fastening said covering resin sheet with a number of L-shaped frame members.

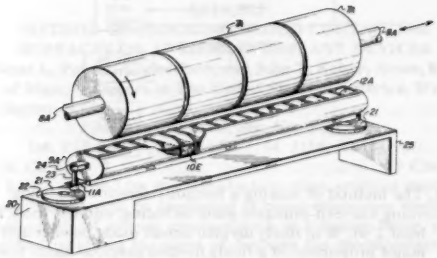
4,016,310

COATER HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTORECEPTOR

Samuel W. Ing, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 23, 1975, Ser. No. 571,047
Int. Cl.² C23C *13/02*
U.S. Cl. 427—251 **15 Claims**





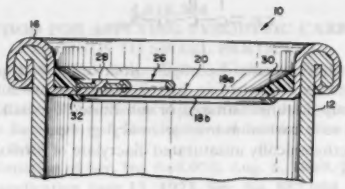
1. A method for batch coating xerographic substrates or bases with at least one vaporizable photoconductive coating material or component thereof applied under vacuum from one or more evaporation crucibles containing a plurality of subdivisions delimited by baffles or end plates and crucible walls and arranged in convenient proximity to the xerographic substrates or bases being coated, comprising heating and vaporizing photoconductive material from one or more crucibles simultaneously or in sequence while moving at least one of said (a) crucibles or said (b) xerographic substrates or bases in a translational manner along parallel planes with respect to each other.

4,016,311

METHOD FOR PROTECTING METAL ENDS

Donald H. Ellerbrock, Florissant, and Robert J. Hough, Baldwin, both of Mo., assignors to Boise Cascade Corporation, Boise, Idaho

Filed May 13, 1974, Ser. No. 469,524
Int. Cl.² B29C *25/00*; B29D *9/08*; B29F *5/00*
U.S. Cl. 427—287 **5 Claims**



1. A method for applying a protective hot melt coating to an easy-open metal end formed of an epoxy-coated aluminum alloy and adapted for closing one end of a container, said metal end having a cylindrical peripheral flange portion and a circular central portion that contains a continuous circular scoreline that defines a removable panel portion and a residual lip portion, said scoreline being formed in the external surface of said central panel portion adjacent said slightly spaced from said flange portion, which comprises the steps of

a. simultaneously rotating the metal end, in an unheated condition, about its central axia and applying to at least one of said surfaces of said central portion over at least that area thereof which is coaxially aligned with the scoreline a layer of a thermoplastic ethylene vinyl acetate hot melt material at a temperature of about 300° F., said metal end being rotated about its axis at a speed of rotation which causes the hot melt layer to form an annular configuration in coaxial alignment with said scoreline, said hot melt layer having a width dimension greater than the width of said scoreline;

b. permitting the hot melt material to at least partially solidify;

c. thereafter heating the end at a temperature of about 250° F. for about 10 seconds to effect softening and reflow of the hot melt layer to produce good wetting of the metal end surface; and

d. permitting the hot melt material to resolidify, whereby the heating of the hot melt material on said end effects an improved bond with the metal end, so that upon rupture of the scoreline to effect removal of the removable panel portion from the central portion, the hot melt layer ruptures, thereby leaving one part of the hot melt layer on the edge area of the removable panel portion and another part of the hot melt layer on the edge area of the residual lip portion.

4,016,312
METHOD OF COATING A CELLULOSIC SUBSTRATE WITH AN ADHERENT POLYMERIC COATING

Hans J. Luthardt, Voorhout, Netherlands, assignor to Akzo N.V., Arnhem, Netherlands

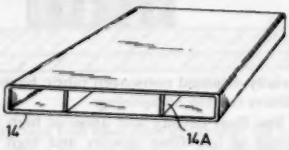
Filed May 28, 1975, Ser. No. 581,583
Claims priority, application Netherlands, May 30, 1974, 7407256
Int. Cl.² B05D 3/10, 7/06, 1/36
U.S. Cl. 427—303 4 Claims

1. The method of covering a substrate which is at least partly cellulose with an adherent coating of a film-forming polymer of an ethylenically unsaturated ester which comprises first applying to the substrate a coating of a coagulant for the polymer, subsequently contacting the thus coated substrate with an aqueous dispersion containing a binder which will dry upon oxidation and the film-forming polymer of an ethylenically unsaturated ester in a weight ratio in the range of 10:90 to 50:50 whereby the polymer coagulates on the surface of the substrate to form a coating and thereafter drying the thus formed coating.

4,016,313
HEAT RESISTANT MATERIAL

Nils G. Schrewelius, Hallstahammar, Sweden, assignor to Bulten-Kanthal Aktiebolag, Sweden

Filed July 28, 1975, Ser. No. 599,750
Claims priority, application Sweden, July 29, 1974, 7409758
Int. Cl.² C04B 35/56
U.S. Cl. 428—35 5 Claims

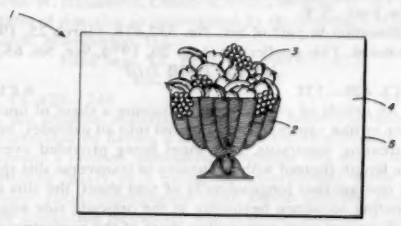


1. A heat resistant fixture for use in firing kilns comprising a porous skeleton of self-bonded silicon carbide, the pores of which are substantially filled with an impregnant containing molybdenum disilicide and from 10 to 60% by weight silicon, said fixture being hollow and having a supporting surface formed thereon.

4,016,314
EMBROIDERED FRUIT BOWL WALL HANGING AND KIT FOR MAKING SAME

Beatrice L. Cowans, and Virginia E. Hall, both of Washington, D.C., assignors to Hallco Inc., Washington, D.C.

Filed June 26, 1975, Ser. No. 590,488
Int. Cl.² A41G 1/00
U.S. Cl. 428—35 5 Claims



1. An article of manufacture suitable for use as a wall hanging comprising:

a. a backing board having a face side and a back side;

b. a background burlap cover tightly stretched over the front side of the backing board and fixedly attached to the back side of the backing board;

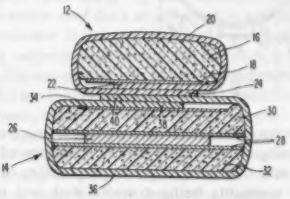
c. a pocket situated on a portion of the background burlap cover, the face of said pocket being attached to the background burlap cover and comprising woven embroidered Strawtex in the shape of a fruit bowl and the back of said pocket comprising the portion of the background burlap cover underlying the face of the pocket; and

d. at least one artificial fruit piece disposed within said pocket and comprising cotton batting covered with Strawtex having a color similar to the fruit being simulated.

4,016,315
SHEATHED SOFT-HANDLE WITH CONCEALED LAPPED ENDS

Marton J. Szabo, Westmont, N.J., assignor to P.H.C. Industries, Inc., Camden, N.J.

Filed Dec. 17, 1975, Ser. No. 641,614
Int. Cl.² B32B 5/18
U.S. Cl. 428—68 15 Claims

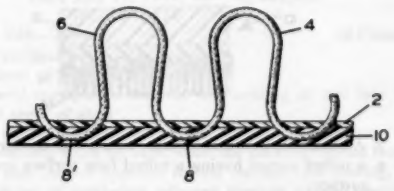


1. A handgrip for a handle comprised of two discrete elongated members each including a cushioning core of flexibly resilient material surrounded by a sheath, the sheath of each member including overlapped longitudinal ends, the overlapped longitudinal ends of one sheath abutting the overlapped longitudinal ends of the other sheath, the overlapped longitudinal ends of each sheath being sealed to each other and the overlapped longitudinal ends of said one sheath being sealed to the abutting overlapped longitudinal ends of said other sheath to form a unitary handgrip with concealed lapped longitudinal ends and wherein the sheath of one discrete elongated member is thermoplastic.

4,016,316
YARN-UNRAVELING RESISTANCE IN CARPET

Walter J. Bohrn, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Mar. 16, 1976, Ser. No. 667,369
Int. Cl.² B32B 5/00
U.S. Cl. 428—85 5 Claims



1. An article comprising a base structure of backing material having tufted thereinto a yarn, said yarn having large loops on one side of the backing material and smaller locps on the back side of the backing material, said small loops on the back side of the material being of yarn of relatively low breaking

strength compared to the yarn in the large loops on the front side of the backing material, and a coating material applied over the back side of the backing material and over the smaller loops on the back side of the backing material.

4,016,317

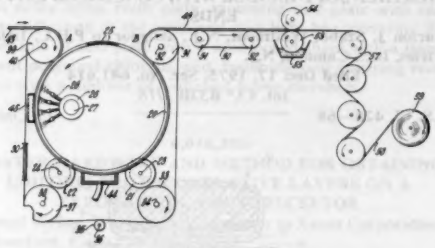
NONWOVEN FABRIC

Frank Kalwaites, Gladstone, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Division of Ser. No. 306,108, Nov. 13, 1972, abandoned, which is a continuation-in-part of Ser. No. 114,449, Feb. 11, 1971, abandoned. This application Mar. 6, 1975, Ser. No. 556,024

Int. Cl.[2] D04H *11/00*

U.S. Cl. 428—88 **3 Claims**



1. A nonwoven fabric comprising a layer of staple length fibers arranged in a predetermined pattern of yarn-like fiber bundles, said bundles comprising a plurality of fiber segments with the segments being consolidated and in a substantial parallelism within each bundle, opposite ends of each fiber included within different bundles so that substantially all fiber ends protrude from one surface of the fabric, said fiber bundles defining a predetermined pattern of areas of low fiber density throughout the fabric, said bundles being located between spaced generally parallel planes generally defining the opposed surfaces of the fabric, and a binder material on one surface of the fabric adhereing fiber ends on said surface together to provide a fabric strength, the opposite surface of the fabric being substantially free of fiber ends and being completely free of binder material.

4,016,318

AUTOMOTIVE CARPET MAT AND METHOD OF PREPARING SAME

Frank A. DiGioia, and Timothy W. Brown, both of Dalton, Ga., assignors to General Latex and Chemical Corporation, Cambridge, Mass.

Filed July 16, 1976, Ser. No. 705,771

Int. Cl.[2] D03D *27/00*; D04H *11/00*

U.S. Cl. 428—95 **17 Claims**

9. A moldable automobile mat, which mat comprises:

a. a tufted carpet having a tufted face surface and a back surface;

b. a thin layer of a stiff, heat-moldable thermoplastic urethane resin having a thickness of up to about one-sixteenth to one-thirty-second of an inch, which layer is obtained from a urethane composition which consists essentially of a polyphenyl methylene diisocyanate, a polyol with a functionality of two or three, a water-scavenging agent and a dimethyl, polysiloxane compound, the isocyanate (NCO) to free hydroxyl (OH) group ratio (NCO/OH) being about 0.67, with the siloxane compound reacted with the hydroxyl groups, the layer bonded to the back surface of the carpet to secure the tufts to the carpet; and

c. a thick layer of a flexible, cross-linked, thermoset, elastomeric urethane resin secured to the stiff thermoplastic urethane resin layer, the elastomeric layer having a thickness of from about one-eighth of an inch to about three-eighths of an inch.

4,016,319

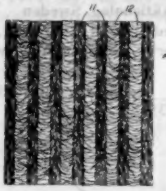
BIAXIALLY ORIENTED NONWOVEN FABRIC HAVING LONG AND SHORT FIBERS

Preston F. Marshall, Walpole, Mass., assignor to The Kendall Company, Boston, Mass.

Continuation-in-part of Ser. No. 506,843, Sept. 17, 1974, Pat. No. 3,969,561. This application Dec. 19, 1975, Ser. No. 642,669

Int. Cl.[2] B32B *5/12*

U.S. Cl. 428—113 **11 Claims**



1. A biaxially oriented nonwoven fabric having long fibers and short fibers therein comprising:

areas of low fiber density and areas of high fiber density, said areas of low fiber density and high fiber density comprising long fibers one-half inch in length or more and short fibers that are less than one-half inch in length, a majority of the fibers in said low fiber density area being long fibers and having a particular configuration and being oriented in a direction substantially normal to the axis of said configuration and, a majority of the fibers in the high fiber density area that lies directly adjacent said low fiber density areas being oriented in a direction substantially parallel with the contours of said configuration of said low fiber density area, a majority of said short fibers being disposed within said high fiber density areas.

4,016,320

SLIT RAW RUBBER ARTICLE

Wilbur E. Harris, Indianapolis, Ind., assignor to Uniroyal Inc., New York, N.Y.

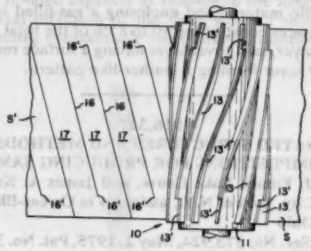
Continuation-in-part of Ser. No. 537,474, March 25, 1966, abandoned. This application Aug. 20, 1970, Ser. No. 65,673

Int. Cl.[2] B32B *3/10*

U.S. Cl. 428—131 **6 Claims**

1. An article of commerce, comprising a sheet of uncured rubber or like raw material to be fed into an extruder, mill or like treating apparatus, said sheet being provided over the entire length thereof with a plurality of transverse slits spaced from one another longitudinally of said sheet, the slits in an alternating sequence beginning at the opposite side edges of said sheet and each terminating short of the respective other side edge of said sheet, and the arrangement of slits in said sheet enabling the latter, upon one end portion thereof being introduced into the bite of such a treating apparatus and

thereby being subjected to a longitudinal pulling force, to separate along the slits into a continuous, relatively narrower,



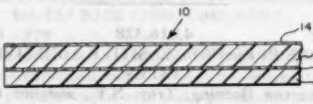
zig-zag strip so as to permit substantially uniform feed of said raw material into the treating apparatus.

4,016,321

PRINTER RIBBON SUBSTRATES

William Ernest McIntyre, Jr., Circleville, Ohio, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 23, 1975, Ser. No. 543,449
Int. Cl.² B41J 31/12; B32B 7/02, 27/34
U.S. Cl. 428—216 **1 Claim**



1. In a composite film base ribbon suitable for use as an ink carrying ribbon in a printing machine comprising an asymmetrically biaxially oriented, heat set polyethylene terephthalate base film having a thickness in the range of about 12 to 36 microns, one surface of which has laminated thereto, by means of an adhesive, a nylon 6/6 free from surface effect modifiers film ribbon backing having a thickness of from about 12 to 25 microns, the improvement in which said nylon film has a nylon surface to steel static coefficient of friction of less than about 0.4 as measured using a capstan friction tester and a haze value of about 4 to 8%.

4,016,322

ABLATIVE PROTECTIVE MATERIAL FOR REENTRY BODIES

Charles W. Haldeman, Concord, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 12, 1975, Ser. No. 612,873
Int. Cl.² B32B 7/00
U.S. Cl. 428—246 **3 Claims**

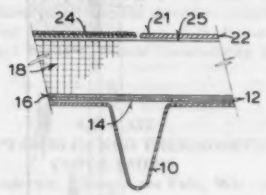
1. An ablative material for use with reentry vehicles and characterized by having a low plasma electron density which comprises a pressed, laminated composite of a multiplicity of alternating layers of a polytetrafluoroethylene resin and a phenolic resin impregnated cloth fabric selected from the group consisting of carbon and graphite cloth in which the total compositional content of said composite is composed of about 15.6 percent by weight carbon, about 3.4 percent by weight phenolic resin, and about 81 percent by weight polytetrafluoroethylene resin.

4,016,323

METHOD AND CONSTRUCTION OF ROOF SYSTEM

Anton F. Volovsek, 12214 W. St. Martins Road, Franklin, Wis. 53132

Filed Sept. 29, 1975, Ser. No. 617,704
Int. Cl.² B32B 3/26; E04D 11/02
U.S. Cl. 428—247 **19 Claims**



1. A method of preparing a building roof system having on its roof deck a prepared upper surface thereon, consisting of applying and affixing an impervious high strength heat resistant single sheet membrane to the adhesive primer and throughout the entire roof deck so as to tightly and completely adhere the membrane to the roof deck, said membrane having a self-adhering adhesive substance on its lower surface for effecting the adhesion of said membrane to said upper surface of said deck and having its upper surface adapted for bonding to insulating foam, said membrane having integral therein a supportive and strengthening mesh throughout and said mesh further being substantially intermediate of the surfaces of the membrane, applying directly to the top surface of the affixed and placed membrane a spray insulating foam to produce when set an even distribution of rigid urethane of a predetermined thickness, said urethane thickness being related to specific requirements of a specified U-factor for said roof system and having an exposed upper surface, subsequently applying directly to the exposed surface of the set urethane insulation a liquid sealant to a thickness exceeding 40 mils and which coats the entire exposed set insulation surface and provides a seamless film having a thickness when set which becomes a waterproof weather protecting surface final coating for the roof system.

4,016,324

SPANDREL GLASS PANEL

William C. Cooke, and Albert H. Agett, both of Kingsport, Tenn., assignors to ASG Industries, Inc., Kingsport, Tenn.

Filed July 19, 1974, Ser. No. 489,984
Int. Cl.² B32B 7/00, 23/00
U.S. Cl. 428—248 **10 Claims**

1. A spandrel panel comprising:

a. a sheet of glass;

b. a semi-transparent metallic film coating on one face of said sheet of glass;

c. barrier means secured to said metallic film coating for preventing show through when the panel is viewed from the side thereof opposite to said metallic film coating;

d. a sheet of insulation adhered directly to said barrier means; and

e. said barrier means including:

1. at least one elastic, heat resistant paint coating applied directly to said metallic film coating,

2. a layer of cloth material adhered to said paint coating, and

3. a second paint coating applied between the first mentioned, elastic paint coating and the cloth, said second

paint coating being different from, less elastic than and less soft than the first mentioned coating.

4,016,325

GLASS FIBER REINFORCED ELASTOMERS

Martin C. Flautt, Granville; Kevin M. Foley, Hebron, and Richard M. Haines, Warsaw, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Apr. 4, 1975, Ser. No. 565,185

Int. Cl.² B32B *17/02*

U.S. Cl. 428—268 **23 Claims**

1. A method for the manufacture of bundles of glass fibers for use in the production of glass fiber-reinforced elastomeric product comprising the steps of coating glass fibers with a size composition consisting essentially of an aqueous emulsion of a polyolefin and isopropanol, forming the coated glass fibers into a bundle and impregnating the bundle of glass fibers with an impregnating composition containing a blend of a resorcinol-aldehyde resin and at least one elastomer without subjecting the coated glass fibers to temperatures above 120° F to form an impregnated bundle.

4,016,326

LAYER COMPOSITION

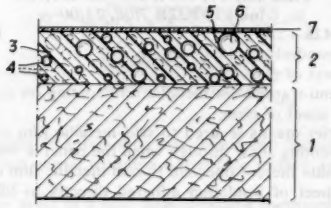
Helmut Schaefer, Via Bernini I, Cerro Maggiore, Italy

Filed Apr. 1, 1975, Ser. No. 563,976

Claims priority, application Italy, Apr. 12, 1974, 21427/74

Int. Cl.² B32B *3/26, 5/18*

U.S. Cl. 428—306 **7 Claims**



1. A composite leather multilayer structure for shoe material and the lime comprising a natural leather carrier layer and a cover layer bonded to said leather carrier layer and consisting of a polyurethane synthetic-resin matrix having bubbles of diameters of substantially 0.009 to 0.6 mm distributed therein, said bubbles each being elastically deformable and having a shell of polyvinylidene chloride copolymer synthetic-resin thermoplastic material and enclosing a gas-filled space, said gas-filled spaces constituting 50 to 85% of the total volume of said cover layer, said cover layer having a surface remote from said carrier layer forming a leather-like pattern.

4,016,327

LAMINATED STRUCTURES AND METHODS AND COMPOSITIONS FOR PRODUCING SAME

Giancarlo J. Fumei, Lake Grove, and James A. Karabedian, Garden City, both of N.Y., assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 573,924, May 2, 1975, Pat. No. 3,988,521, which is a continuation-in-part of Ser. No. 275,951, July 28, 1972, abandoned. This application July 31, 1975, Ser. No. 600,614

Int. Cl.² B32B *5/18, 27/00*

U.S. Cl. 428—314 **5 Claims**

1. A laminated structure comprising: (1) a substrate of high polymeric material, (2) a substrate of a porous hydrophilic cellulosic material, and (3) a layer bonding said substrates comprising particles of a polymer of the same kind as said high polymeric material substrate (1) but of an average molecular weight of from about four to about 100 percent of said high polymeric material substrate bonded to the surface of said substrate (1) and a predominant amount of a water-dispersible adhesive preferentially adherent to said cellulosic substrate surrounding said bonded particles so as to mechanically interlock with said particles.

4,016,328

SILICONE PRESSURE-SENSITIVE ADHESIVES AND TAPES

Albert Emerson Horning, Troy, N.Y., assignor to General Electric Company, Waterford, N.Y.

Division of Ser. No. 367,960, June 7, 1973, Pat. No. 3,929,704. This application Aug. 22, 1975, Ser. No. 606,938

Int. Cl.² C08L *83/04;* **C09J** *7/02*

U.S. Cl. 428—355 **15 Claims**

1. A pressure-sensitive tape comprising a coherent unitary backing and a pressure-sensitive adhesive applied to a surface of said backing, said adhesive comprising the siloxane product of heat intercondensation of a silicone resin, a silicone gum and a catalytic amount of a curing agent therefore, said curing agent comprising before curing from about 10 to about 90% by weight of 2, 4, - dichlorobenzoyl peroxide, from about 2 to about 30% by weight of a plasticizer therefore, said plasticizer being a high boiling ester of low volatility, and for the balance an extender therefore, said extender comprising an alkylaryl or an alk*y*laralkyl siloxane fluid containing at least about 3% of aryl-silicon or aralkyl-silicon bonds out of the total carbon-silicon linkages.

4,016,329

MULTIFILAMENT

Mitsuyoshi Matsuyama, and Tetsuhiro Kusunose, both of Nobeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 299,621, Oct. 11, 1972, abandoned. This application Jan. 29, 1975, Ser. No. 545,167

Claims priority, application Japan, Oct. 11, 1971, 46-79457; July 27, 1972, 47-87880

Int. Cl.² D02G *3/00*

U.S. Cl. 428—375 **1 Claim**

1. A non-twisted multifilament yarn comprising a polyamide material wherein each of the monofilaments has over its overall peripheral surface a number of relatively evenly and densely distributed, ripple-like undulations, the number of undulations being in the range of from 4 to 20 X 10^7 per square cm when observed through an electron microscope,

the mean height of the surface undulations being in the range of $2.5 - 25 \times 10^{-5}$ mm, said monofilaments being thermally and locally bonded together at random in the longitudinal as well as lateral direction of the yarn, each of these thermal bonds extending substantially longer axially rather than later-

ally of the yarn, wherein over 90% of the constituent monofilaments represent linear interfilamentary local bonds per inch of the yarn, the linear length of each of over 80% of these bonds amounting to at least 5 mm, for providing necessary filament consistency without representing intentional interfilamental linkages of a non-torqued and non-bulked nature.

4,016,330
WATER-SOLUBLE WIRE ENAMEL

Deno Laganis, Schenectady, N.Y., assignor to Schenectady Chemicals, Inc., Schenectady, N.Y.

Division of Ser. No. 536,963, Dec. 27, 1974, Pat. No. 3,974,115, which is a continuation-in-part of Ser. No. 311,701, Dec. 7, 1972. This application Feb. 19, 1976, Ser. No. 659,352

Int. Cl.² B32B *15/08*; **C08L** *67/02*

U.S. Cl. 428—379 **20 Claims**

1. A wire coated with a composition comprising:

1. a water-soluble polyester which is a condensation product of a polycarboxylic acid and a polyhydric alcohol said polycarboxylic acid comprising (a) a tribasic carboxylic acid and (b) an aromatic dicarboxylic acid with 0 to 0.50 mol of an aliphatic or cycloaliphatic dicarboxylic acid per mol of the aromatic dicarboxylic acid, said polyhydric alcohol comprising a dihydric alcohol, the molar ratio of tribasic carboxylic acid to the other acids present being from 25/75 to 85/15, there being present an excess of hydroxyl groups over carboxyl groups in said polyester in the range of 10 to 5%.
2. hydroxymethylated diacetone acrylamide in an amount of 0.1 to 10% by weight of the total solids as a cross-linking agent for said polyester, and
3. 0.5 to 10% by weight of the total solids of a water soluble organic titanate as a synergistic cross-linker with (2).

4,016,331
COMPOSITE POLYMERIC MATERIAL FORMED WITH AN EPITAXIAL CRYSTALLINE FILM OF POLYMERIC SULFUR NITRIDE, AND METHOD OF PREPARING SAME

Anthony Frank Garito, Radnor; Alan J. Heeger, Wynnewood; Alan G. MacDiarmid, Drexel Hill, all of Pa.; Arthur A. Bright, North Olmstead, Ohio; Marshall J. Cohen, Philadelphia, and Chester M. Mikulski, Melrose Park, both of Pa., assignors to The Trustees of the University of Pennsylvania, Philadelphia, Pa.

Filed Jan. 26, 1976, Ser. No. 652,611

Int. Cl.² B05D *5/12*; **B32B** *27/06*; **C23C** *13/02*, *13/04*

U.S. Cl. 428—421 **19 Claims**

1. A composite polymeric material having metallic surface properties comprising a highly-oriented thermoplastic polymeric substrate and an epitaxial crystalline film of polymeric sulfur nitride formed on the surface of said substrate, said polymeric sulfur nitride film being completely oriented parallel to the direction of orientation of said substrate and having a relatively high degree of anisotropy with respect to its electrical conductivity and optical properties.

10. A method of preparing a composite polymeric material having metallic surface properties comprising the steps of heating solid crystalline polymeric sulfur nitride to a temperature above its sublimation point to produce a vapor of said polymeric sulfur nitride, and thereafter condensing said polymeric sulfur nitride vapor onto the surface of a highly-oriented thermoplastic polymeric substrate to thereby form on said substrate an epitaxial crystalline polymeric sulfur nitride film completely oriented parallel to the direction of orientation of said substrate and having a relatively high degree of anisotropy with respect to its electrical conductivity and optical properties.

4,016,332
MERCAPTAN BLOCKED THERMOSETTING COPOLYMERS

Carl Clement Anderson, Menomonee Falls, Wis., and Rostyslaw Dowbenko, Gibsonia, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed May 1, 1972, Ser. No. 248,846

Int. Cl.² C08F *28/02*; **C08L** *67/02*, *67/06*

U.S. Cl. 428—500 **11 Claims**

1. A polymer prepared by the process comprising:

a reacting

1. a polyol, and
2. a mercaptan comprising a hydrocarbon chain of from 1 to about 18 carbon atoms which has been substituted with at least one carboxyl group to provide a mercapto-terminated reaction product;

b. reacting said mercapto-terminated reaction product with one or more ethylenically unsaturated monomers in the presence of a peroxygen or azo catalyst to form said polymer.

11. An article of manufacture comprising a substrate having a coating of the polymer of claim 1 applied thereon.

4,016,333
RADIATION CURABLE COATINGS HAVING NONADHERENT SURFACES

Joseph E. Gaske, and Nick T. Georgas, both of Chicago, Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Oct. 25, 1974, Ser. No. 518,004

Int. Cl.² B05D *3/06*

U.S. Cl. 428—447 **13 Claims**

1. A radiation polymerizable nonaqueous emulsion adapted to deposit coatings having nonadherent surfaces comprising a radiation polymerizable polyethylenically unsaturated liquid having emulsified therein from 2–50%, based on the weight of the emulsion, of a liquid alkyl hydrogen polysiloxane.

4,016,334
METHOD OF APPLYING HIGH ADHESION ULTRAVIOLET CURABLE COATINGS AND COATED ARTICLES

George L. Collins, Murray Hill, and John R. Costanza, North Plainfield, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Feb. 18, 1975, Ser. No. 550,337

Int. Cl.² B05D *3/06*

U.S. Cl. 428—463 **9 Claims**

1. A process for applying an adherent coating to a substrate which comprises:

a. applying a first coating consisting essentially of an ultraviolet curable monomer having at least one ultraviolet polymerizable site of alpha beta ethylenic unsaturation, no more than about 12 carbon atoms per molecule, at least about two carbonyl groups per molecule, having no other groups interferingly reactive with the alpha beta ethylenic unsaturation ultraviolet curing mechanism, and having no unsaturation other than alpha beta ethylenic unsaturation, to a coating thickness of about at least 10^{-3} microns;

b. treating said coating with heat, infrared or microwave radiation;

c. applying a second coating of an ultraviolet curable coating composition over said first coating wherein said second composition comprises about 40 to about 100 percent, by weight, based upon the total second coating curable composition, of an alpha beta ethylenically unsaturated vinyl polymerizable compound having at least two sites of ultraviolet polymerizable unsaturation and up to about 60 percent, by weight, on the same basis, of another alpha beta ethylenically unsaturated vinyl polymerizable compound containing one site of ultraviolet polymerizable vinyl unsaturation, about 0.1 to about 15 percent, by weight, based upon the total curable system in said coating, of a photoinitiator; and

d. subjecting the coated substrate to ultraviolet radiation.

4,016,335
UREA-GLYOXAL-FORMALDEHYDE CELLULOSE REACTANT

Tsai Hsiang Chao, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 356,685, May 2, 1973, Pat. No. 3,903,033. This application Feb. 7, 1975, Ser. No. 548,109

Int. Cl.² B05D *3/12, 3/02*

U.S. Cl. 428—526 **6 Claims**

1. A process for producing a curable low formaldehyde releasing finish on cellulosic textile materials comprising:

applying an aqueous solution of water-soluble urea-formaldehyde-glyoxal condensation product, an accelerator and a surface active agent to a cellulosic textile,

drying the treated textile, and

pressing the dried textile at elevated temperature;

said water-soluble urea-formaldehyde-glyoxal condensation product prepared by a process comprising

reacting in an equeous medium about 1.0 mole of urea, about 1.0 mole of glyoxal and less then 2.0 moles of formaldehyde at a pH maintained between 6.2 and 6.7 and at a temperature of 40° C. until the formation of 1,3-demethylol-4,5-dihydroxy-2-imidazolidinone is essentially completed,

adding an acidic material to the reaction solution to adjust the pH between 2.0 and 3.0,

maintaining the pH between 2.0 and 3.0 and at a temperature between 40° and 90° C. for a period of at least 0.5 to 3.0 hours and

adding a base to the solution to adjust the final pH of the solution between 5.0 and 7.0.

4,016,336
MELAMINE RESIN FILMS PREPARED BY IMPREGNATING OF PAPER, CELLULOSE, FLEECE OR FABRIC

Karl Schnee, Maintal; Dieter Tichy, Frankfurt am Main; Walter Michel, Frankfurt am Main, and Günter Gruber, Frankfurt am Main, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Germany

Division of Ser. No. 442,644, Feb. 14, 1974, Pat. No. 3,936,547. This application Nov. 7, 1975, Ser. No. 629,765

Claims priority, application Germany, Feb. 24, 1973, 2309334

The portion of the term of this patent subsequent to Feb. 3, 1993, has been disclaimed.

Int. Cl.² B32B *29/06*

U.S. Cl. 428—530 **4 Claims**

1. A melamine resin film prepared by impregnating paper, cellulose fleece or cellulose fabric with a monomer solution of at least one member selected from the group consisting of monomeric dimethylolmelamine monomethylether, dimethylolmelamine dimethylether, trimethylolmelamine monomethylether, trimethylolmelamine dimethylether and trimethylolmelamine trimethylether and drying the thusly impregnated paper, cellulose fleece or cellulose fabric at a temperature of about 90° to about 200° C.

4,016,337
WATER-DISPERSIBLE COMPOSITION AND METHOD FOR PRODUCTION

Jau Yann Hsu, Brookfield, Conn., assignor to Societe d'Assistance Technique Pour Produits Nestle S.A., Lausanne, Switzerland

Filed Feb. 13, 1976, Ser. No. 657,758

Int. Cl.² A23L *1/195;* **A23C** *9/16*

U.S. Cl. 426—99 **12 Claims**

1. A water-dispersible edible composition comprising an intimate admixture of co-agglomerates of a finely-divided non-dispersible material and a silicon dioxide flow agent, said co-agglomerates having a thin coating of an emulsion comprising edible fat and glycerol over their external surfaces.

4,016,338
GALVANIC ELEMENT

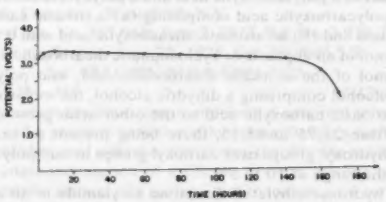
Helmut Lauck, Glashutten, Germany, assignor to Varta Batterie Aktiengesellschaft, Hannover, Germany

Filed Aug. 16, 1976, Ser. No. 714,373

Claims priority, application Germany, Sept. 6, 1975, 2539736

Int. Cl.² H01M *6/14*

U.S. Cl. 429—149 **9 Claims**



1. A galvanic element having a negative electrode of a strongly electro-positive metal, a non-aqueous electrolyte, and a positive electrode containing silver compounds, characterized in that

the electro-chemically reducible component of the positive electrode mass includes silver carbonate.

4,016,339
SALT WATER BATTERY

Thomas J. Gray, Armdale, and Jan Wojtowicz, Dartmouth, both of Canada, assignors to Her Majesty the Queen in right of Canada as represented by the Minister of National Defence, Ottawa, Canada

Filed Nov. 6, 1975, Ser. No. 629,569

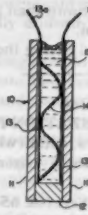
Claims priority, application Canada, Nov. 6, 1974, 213150

Int. Cl.² H01M *4/02*

U.S. Cl. 429—219 **8 Claims**

1. A battery electrode structure having a substantially flat configuration comprising a cast mass of electrochemically active material, said mass having contained therein and exposed at opposed major surfaces thereof, an open-mesh elec-

trically conductive structure for connection to a battery terminal, said cast mass further containing an open-mesh electri-



cally conductive support member in contact with said exposed open-mesh electrically conductive structure.

4,016,340

HYDROXYL-CONTAINING POLYMERS HAVING AMINIMIDE GROUPS ATTACHED THERETO THROUGH AN ETHER LINKAGE

Henry S. Kolesinski, Burlington; Avinash C. Mehta, Belmont, and Lloyd D. Taylor, Lexington, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

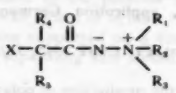
Filed Aug. 7, 1975, Ser. No. 602,598

Int. Cl.² C08F *8/30*; C08B *15/06*, *31/08*, *37/04*

U.S. Cl. 526—7 **12 Claims**

1. A novel composition of matter comprising a polymer containing a plurality of hydroxyl groups and having aminimide groups attached to said polymer through an ether linkage.

6. The process for preparing a polyhydroxyl-containing polymer having aminimide groups attached thereto which comprises reacting a polymer containing a plurality of hydroxyl groups with a compound of the formula:



wherein each R_1, R_2 and R_3 are alkyl groups; X is chloro, iodo or bromo; and each R_4 and R_5 are hydrogen, lower alkyl or phenyl in an organic solvent for said polymer containing a plurality of hydroxyl groups and said compound.

12. The process for preparing a cross-linked hydroxyl-containing polymer which comprises the deamination of a polymer containing a plurality of hydroxyl groups with aminimide groups grafted thereon through an ether linkage.

4,016,341

BULK POLYMERIZATION OF VINYL CHLORIDE

Kinya Ogawa; Kazuhiko Kurimoto; Yoshitsugu Eguchi, and Satoshi Kuwata, all of Ibaragi, Japan, assignors to Shin-Etsu Chemical Company Limited, Tokyo, Japan

Filed Oct. 23, 1975, Ser. No. 625,044

Claims priority, application Japan, Oct. 28, 1974, 49-124096

Int. Cl.² C08F *3/22*

U.S. Cl. 526—62 **27 Claims**

1. In a method for the bulk polymerization of vinyl chloride monomer or a mixture thereof with a copolymerizable monomer or monomers, the improvement which comprises coating the walls of a polymerization vessel and other surfaces coming into contact with the monomer or monomers, prior to the polymerization, with a solution of at least one phosphoric compound selected from the group consisting of phosphoric esters, polyphosphoric esters, and their alkali metal salts thereof.

4,016,342

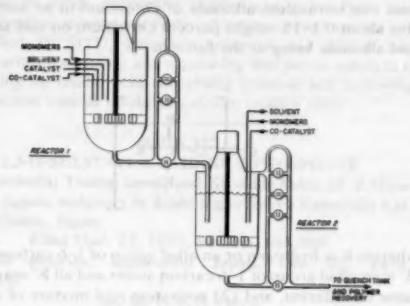
PROCESS AND PRODUCT

Joseph Wagensommer, Westfield, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 556,088, March 7, 1975, abandoned, which is a continuation of Ser. No. 267,441, June 29, 1972, abandoned. This application Jan. 7, 1976, Ser. No. 647,151

Int. Cl.² C08F *210/00*, *212/00*

U.S. Cl. 526—65 **8 Claims**



1. A continuous process for the production of elastomeric copolymers of ethylene and a higher C_3 to C_{10} alpha-olefin, which may additionally have polymerized therewith an acyclic or alicyclic nonconjugated diolefin which comprises connecting two stirred reactors in series,

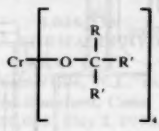
1. adding to the first reactor:
   ethylene, a higher C_3 to C_{10} alpha-olefin, or additionally said acyclic or alicyclic nonconjugated diolefin, a Ziegler-Natta type catalyst consisting of at least one transition metal component and an organoaluminum cocatalyst consisting of a dialkyl aluminum halide having the formula R_2AlX, where R is a monovalent hydrocarbon radical, selected from the group consisting of C_1 to C_{13} alkyl, alkylaryl, and cycloalkyl radicals, X is a halogen having an atomic number equal to or greater than 17;
2. polymerizing a portion of the monomers in the first reactor at a temperature in the range of 0° to 100° C., at a pressure of from 0 to 1000 psig, to form a polymer cement;
3. passing said polymer cement from the first reactor to a second reactor, connected in series with said first reactor;
4. adding to said second reactor:
   ethylene, said higher C_3 to C_{10} alpha-olefin, additional acyclic or alicyclic nonconjugated diolefin and an organoaluminum cocatalyst consisting of an alkyl aluminum sesquihalide having the formula R_mAlX_n, where R is a monovalent hydrocarbon radical selected from the group consisting of C_1 to C_{12} alkyl, alkylaryl, and cycloalkyl radicals, *m* and *n* are each equal to 1.5, X is a halogen having an atomic number equal to or greater than 17;
5. further polymerizing the monomers at essentially the same conditions as in the first reactor;
6. discharging the contents from the second reactor and terminating the polymerization reaction of said discharged contents; and
7. collecting and finishing the copolymer.

4,016,343
TETRAVALENT CHROMIUM ALKOXIDE POLYMERIZATION CATALYST AND METHOD

Raymond E. Hoff, Palatine, and Mitsuzo Shida, Barrington, both of Ill., assignors to Chemplex Company, Rolling Meadows, Ill.

Filed Aug. 22, 1975, Ser. No. 607,012
Int. Cl.² C08F 4/78, 10/00
U.S. Cl. 526—96 **18 Claims**

1. A catalyst for polymerizing one or more 1-olefins to a high density polymer, prepared by (1) forming a mixture of a finely divided support selected from the group consisting of silica, alumina, zirconia, thoria and composites thereof and at least one tetravalent alkoxide of chromium in an amount to give about 0.1–10 weight percent chromium on said support, said alkoxide being of the formula



wherein R is hydrogen or an alkyl group of 1–6 carbon atoms, R′ is an alkyl group of 1–6 carbon atoms and all R′ may be the same or different, and (2) activating said mixture of support and alkoxide with a dry gas that contains oxygen.

4,016,344
OLEFIN POLYMERIZATION CATALYST

Rajindar K. Kochhar, Katy, and Robert J. Rowatt, Orange, both of Tex., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation of Ser. No. 159,043, July 1, 1971, abandoned. This application Feb. 4, 1976, Ser. No. 655,197
Int. Cl.² C08F 4/66, 4/02, 10/00
U.S. Cl. 526—124 **10 Claims**

1. A process for preparing a catalyst component which comprises contacting an inorganic magnesium compound selected from the group consisting of magnesium oxide and basic magnesium carbonate with an organic peroxide in the presence of an inert solvent and at an elevated temperature of at least 20° C., recovering the peroxide-treated inorganic magnesium compound from the inert solvent, drying the peroxide-treated inorganic magnesium compound at an elevated temperature of at least 50° C., and thereafter contacting the peroxide-treated inorganic magnesium compound with a transition metal halide selected from the group consisting of those vanadium and titanium halides normally liquid at room temperature.

4,016,345
PROCESS FOR POLYMERIZING TETRAFLUOROETHYLENE IN AQUEOUS DISPERSION

David Alan Holmes, Vienna, W. Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 317,804, Dec. 22, 1972, abandoned. This application Mar. 24, 1976, Ser. No. 670,075
Int. Cl.² C08F 14/26
U.S. Cl. 526—206 **1 Claim**

1. Process for preparing polytetrafluoroethylene resin which comprises

a. polymerizing tetrafluoroethylene in an aqueous reaction medium in the presence of a nontelogenic dispersing agent which is a fluorinated carboxylic acid or fluorinated carboxylate containing from 7 to 10 carbons atoms and which is present in an amount sufficient to maintain the polymer particles produced in a dispersed state; and in the presence of an inorganic persulfate initiator; and at a temperature of between about 95° and about 125° C; and wherein said initiator is continuously added to the reaction medium during the polymerization until between about 50% and 80% of the total amount of polytetrafluoroethylene to be formed is formed with the total amount of initiator added being no more than about 0.011 gram per liter of reaction medium,

b. followed by coagulating and drying the resin.

4,016,346
CATIONIC POLYMERIZATION PROCESS

Ronald Thomas Wojcik, Stamford, and Erwin Richard Ruckel, Darien, both of Conn., assignors to Arizona Chemical Company, Wayne, N.J.

Filed Feb. 3, 1976, Ser. No. 654,687
Int. Cl.² C08F 10/14
U.S. Cl. 526—221 **10 Claims**

1. A process for polymerizing α-pinene monomer or a mixture of at least 50% α-pinene and other terpene monomers which comprises the steps of: establishing a catalyst system comprising (1) a minor amount of an antimony halide, (2) a major amount of aluminum chloride or aluminum bromide or mixtures of the latter in an inert solvent, adding thereto at a temperature between about minus 30° C and about plus 30° C α-pinene monomer or a mixture of at least 50% α-pinene and other terpene monomers incrementally with agitation, adjusting and maintaining the temperature of the mixture at about minus 30° C to about plus 30° C for from about one to about 4 hours to obtain an α-pinene polymer.

4,016,347
PROCESS FOR THE PRODUCTION OF POLYMERS HAVING A BROAD MOLECULAR WEIGHT DISTRIBUTION

Neithart Sommer; Gerhard Cuntze, both of Marl, and Wolfgang Boehmer, Oer-Erkenschwick, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Aug. 8, 1975, Ser. No. 603,172
Claims priority, application Germany, Aug. 9, 1974, 2438322
Int. Cl.² C08F 4/48, 36/06
U.S. Cl. 526—64 **4 Claims**

1. A process for the production of polymers having a broad molecular weight distribution by the continuous-adiabatic polymerization of 1,3-butadiene alone or in admixture with a comonomer in a diluent and in the presence of an organolithium catalyst which comprises feeding a stream of 1,3-butadiene and diluent at a constant flow rate of at least 1.10^{-3} liters/sec./cm² to an elongate reaction zone and feeding a stream of the catalyst to the inlet zone at a rate which is periodically increased and decreased with a cycle time of at least 1 sec., said flow rate and rate of change of catalyst flow rate being such that segments of reaction product along the length of the initial portion of the elongate reaction zone contain polymer having an average molecular weight which differs from the average molecular weight of the polymer in preceding and following like segments of reaction product adjacent thereto, and said reaction zone has a length to diameter ratio from about 5:1 to about 200:1 and is sufficiently elongate that said adjacent segments become remixed before the reaction product is discharged from said reaction zone.

4,016,348
REACTOR PROCESS AND APPARATUS FOR CONTINUOUS POLYMERIZATION

George F. Adams, 2111 E. 26th St., Tulsa, Okla. 74114

Continuation of Ser. No. 228,241, Feb. 22, 1972, abandoned, which is a continuation of Ser. No. 845,753, July 29, 1969, abandoned. This application June 13, 1974, Ser. No. 479,173
Int. Cl.² C08F 12/08, 12/16
U.S. Cl. 526—293 **3 Claims**

1. A continuous process of polymerizing a composition

consisting essentially of vinyl monomers selected from the group consisting of styrene, alkyl substituted styrene, halogen substituted styrene, and mixtures thereof comprising the steps of:

continuously flowing said monomer through reaction tubing of substantially uniform cross-section in essentially one direction;

alternately dividing said flowing monomer, within said reaction tubing, into two essentially equal compartments of turning flow and thence into four essentially equal compartments of straight flow, whereby said flow periodically merges and separates along the length of said tubing to create, across a given lateral cross-section of monomer, a substantially uniform temperature maintained solely by external cooling of said reaction tubing, and to create a uniform rate of flow across said tubing until polymerized to a desired condition; and

controllably maintaining the desired temperature of said external cooling.

4,016,349

PROCESS FOR REMOVING VANADIUM RESIDUES FROM POLYMER SOLUTIONS

James Michael McKenna, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 30, 1975, Ser. No. 627,460

Int. Cl.² C08F *6/08*

U.S. Cl. 528—482 **16 Claims**

1. A process for removing vanadium residues from a solution in an organic solvent of an α-olefin homopolymer or copolymer with one or more hydrocarbon monomers, said process comprising with steps of first contacting said solution at a temperature of about room temperature to about 140° C. with a polar liquid capable of extracting dissolved vanadium compounds and soluble in the polymer solvent under the process conditions to an extent of at most 0.5 weight percent, said polar liquid being supported on a finely divided, inert, solid material; then separating said solution from said solid material;

with the provisos that:

1. the polar liquid has at least one functional group other than carbon-carbon or carbon-hydrogen groups, and contains at least one oxygen, sulfur, nitrogen, or phosphorus atom; and
2. when the polar liquid also contains carbon-carbon groups, there is present at least one such functional group for each eight carbon atoms.

4,016,350

REDUCTION OF VINYL CHLORIDE IN FREE SPACE SURROUNDING POLYVINYL CHLORIDE POWDER

Edwin Studley Smith, Cuyahoga Falls, and Richard A. Marshall, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 20, 1975, Ser. No. 633,736

Int. Cl.² C08F *6/00*

U.S. Cl. 528—486 **6 Claims**

1. The method of reducing the monomeric vinyl chloride in the free space surrounding polyvinyl chloride resin powder which comprises mixing polyvinyl chloride powder with 0.4 or more parts per 100 parts of said polyvinyl chloride powder of a reactive material selected from the group consisting of p-toluenesulfonic acid, octadecyl thioglycolate and octadecyl 3-mercaptopropionate.

4,016,351

PECTIC SUBSTANCES WITH VARYING METHOXYL CONTENT AND PROCESS THEREFOR

Emile H. Eschinasi, P.O. Box 7217, Haifa, Israel

Filed Feb. 4, 1976, Ser. No. 655,294

Int. Cl.² C08B *37/06*

U.S. Cl. 536—2 **15 Claims**

1. A process for the production of pectic substances having a methoxyl content of about 2 to about 12% from pectin bearing substances comprising combining naturally occurring pectin bearing substances and a source of calcium ions at a pH range of about 3 to 8 to temporarily immobilize and fix said pectic substances and to cause the release of superfluous sugar and soluble solids containing liquors and juices from said pectin bearing substances while achieving a simultaneous and controlled, IN SITU, demethoxylation of said pectins; and subsequently extracting and separating said pectic substances by adding an oxalic acid containing solution and removing said calcium ions as insoluble calcium oxalate salts.

4,016,352

2,3-O-SULFINYL-CYTIDINE-5-PHOSPHATE

Kozo Tsunoda; Tsuneo Sowa, and Kiyohide Sako, all of Miyazaki, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

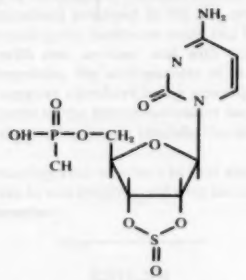
Filed Mar. 13, 1975, Ser. No. 558,098

Claims priority, application Japan, Dec. 27, 1974, 49-148936

Int. Cl.² C07H *19/10*

U.S. Cl. 536—29 **1 Claim**

1. 2′,3′-O-Sulfinyl-cytidine-5′-phosphate represented by the formula



4,016,353

PROCESS FOR PRODUCING ORGANIC ACID ESTERS OF CELLULOSE

David W. Goheen, Camas; Michael D. Fahey, Vancouver, and Harvey L. Claussen, Seattle, all of Wash., assignors to Crown Zellerbach Corporation, San Francisco, Calif.

Filed Apr. 14, 1975, Ser. No. 567,580

The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.

Int. Cl.² C08B *3/06, 3/20*

U.S. Cl. 536—69 **23 Claims**

1. A process for forming organic acid esters of cellulose, in an efficient and rapid manner, which includes a controlled esterification reaction comprising confricating cellulose, at high consistency, in the presence of esterification chemicals, to form a confricated cellulose ester product, said confrication step including high energy, frictional interaction of said cellulose and esterification chemicals, respectively, which are maintained in relatively intimate contact one with the other, and furnishing the predominant means for providing penetration of said esterification chemicals for distribution throughout the cellulose, without substantial degradation of the confricated cellulose ester product formed.

18. A process for rapidly forming organic acid esters of cellulose which comprises the steps of:

a. introducing cellulose, at high consistency, and esterifica-

tion chemicals into an area formed within a high energy reactor, said area including means for confricating said high-consustency cellulose in the presence of said esterification chemicals; and

b. confricating said cellulose and esterification chemicals, respectively, said configuration step including the high energy, frictional interaction of said cellulose and esterification chemicals which are maintained at relatively intimate contact one with the other, said resultant confricated product being characterized in that said esterification chemicals have substantially penetrated, and are uniformly distributed throughout, said cellulose.

4,016,354

PREPARATION OF PHARMACOLOGICALLY ACTIVE HYDROXYALKYL STARCH

Charles Trevour Greenwood, Watford, England, assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 6, 1975, Ser. No. 620,001

Claims priority, application United Kingdom, Oct. 7, 1974, 43391/74

Int. Cl.² C08B *31/08*

U.S. Cl. 536—111 **10 Claims**

1. A process of preparing a substantially inorganic salt free, colorless, pharmacologically active hydroxyalkyl starch which comprises:

a. subjecting a waxy starch composed principally of amylopectin and little or no amylose to acid hydrolysis at a temperature below the gelatinization temperature of the starch to effect a molecular size reduction while substantially retaining the granular form of the starch;

b. reacting the hydrolyzed, granular starch with a reducing agent to reduce aldehydic reducing end groups of the hydrolyzed strach to the corresponding alcohol groups under reaction conditions which prevent the dissolution of the granular starch;

c. suspending the stabilized, hydrolyzed, granular starch in a liquid medium comprising a water-miscible organic solvent, the hydrolyzed, granular starch being substantially insoluble in the liquid medium;

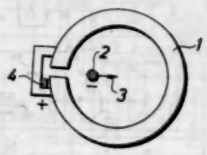
d. reacting the stabilized, hydrolyzed, granular starch in suspension with a starch hydroxyalkylating agent under basic pH conditions, until a hydroxyalkylated granular starch having a molecular substitution within the range from about 0.3 to about 0.9 is obtained; and

e. washing the hydroxyalkylated granular starch to obtain a substantially inorganic salt free, colorless, pharmacologically active hydroxyalkyl starch.

4,016,355
DEVICE IN DIRECT CURRENT ARC FURNACES

Sven-Einar Stenkvist, Vasteras, Sweden, assignor to ASEA AB, Vasteras, Sweden

Filed July 10, 1975, Ser. No. 594,739
Claims priority, application Sweden, July 23, 1974, 7409557
Int. Cl.² H05B 7/20
U.S. Cl. 13—11 4 Claims

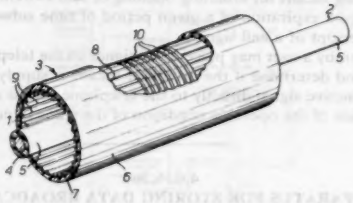


1. A DC electric arc furnace comprising a furnace enclosure having a hearth for containing a melt, said hearth having a contact electrode for the melt, an arcing electrode positioned above the melt for forming an arc with the melt when placed in circuit therewith via said electrode, said arcing and contact electrodes being relatively offset in a horizontal direction so that the arc is normally angularly deflected with respect to a vertical direction, and means for applying a magnetic field to the arc so as to control its arcing direction.

4,016,356
HEAT RECOVERABLE ARTICLE

Robert H. McLoughlin, Swindon, England, assignor to Raychem Limited, London, England

Continuation-in-part of Ser. No. 504,375, Sept. 9, 1974, Pat. No. 3,946,143. This application Feb. 2, 1976, Ser. No. 654,272
Claims priority, application United Kingdom, Sept. 10, 1973, 42483/73
Int. Cl.² H02G 15/08
U.S. Cl. 174—35 R 9 Claims



1. A heat recoverable article comprising a first hollow member composed of heat-recoverable material and an annular corrugated sheath disposed therein, the sheath having longitudinal corrugations extending over substantially the whole of its length and transverse corrugations extending over only a part of its length and being transverse to said longitudinal corrugations, the region having only longitudinal corrugations being collapsible upon the imposition of radially inward recovery force of the member.

4,016,357
FLOOR STRUCTURE FOR THE ENVIRONMENT OF A MODULAR COMPUTER SYSTEM

Thomas C. Abrahamsen, Birmingham, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed July 18, 1975, Ser. No. 597,019
Int. Cl.² H05K 9/00; E04F 15/024
U.S. Cl. 174—48 3 Claims

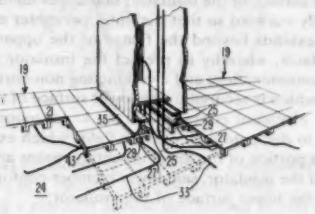
1. A site area for a computer system wherein the interconnections between the hardware units may be removed from view and displaced from the access pathways utilized by humans in attending the computer system and wherein the hardware units may be added to or substituted within the system with minimal inconvenience and disruption comprising:

a. a plurality of first elevated support members providing a base for each of the hardware units;

b. a plurality of second elevated support members secured to the first elevated support members of each hardware unit;

c. a permanent flooring in the site area;

d. the hardware units being disposed on the permanent flooring in proper relationship to one another so that the second elevated support members thereof are contactably supported by said permanent flooring;



e. means interconnecting the hardware units with the required cables and the like so that the interconnections are disposed on and along the permanent flooring;

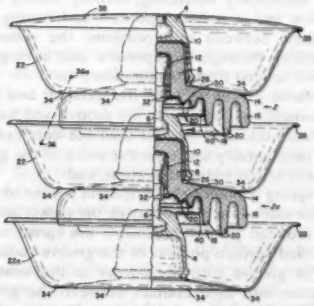
f. a plurality of rectangularly shaped modular third elevated support members arranged in the site area intermediate and surrounding the hardware units and in abutting relationship with one another and with the first elevated support members, the arrangement of the modular third elevated support members being accompanied by slight displacements of the interconnections such that the third elevated support members straddle the interconnections; and

g. means retaining said members in said abuttable relationship relative to one another and with said second elevated support member.

4,016,358
ELECTRICAL INSULATOR WITH CONTAMINATION AND FLASH-OVER ELIMINATOR

Clyde N. Richards, 4887 Mission Blvd., San Diego, Calif. 92109

Filed Mar. 11, 1976, Ser. No. 666,023
Int. Cl.² H01B 17/48
U.S. Cl. 174—141 R 4 Claims



1. An improved electrical insulator adapted to be linked

together with like insulators into a chain of such insulators, said insulator having a dielectric body provided with an upper surface which has an outwardly and downwardly extending flange and a lower surface which has a plurality of downwardly extending petticoats, a lower mounting means which is conductive, which is secured within said dielectric body and which protrudes from the lower surface, and an upper mounting means, which is conductive and is secured to the top of said dielectric body to receive and hold the lower mounting means of a second insulator to be positioned above, wherein the improvement comprises: a conducting non-corrosive upper member which is secured to the upper surface of the insulator and in electrical contact with the upper mounting means whereby to dissipate high electric fields which exist between the bottom edge of the upper mounting means and the upper surface of the insulator, said upper member extending radially outward so that the outer perimeter of the upper member extends beyond the flange of the upper surface of said insulator, whereby to protect the insulator from atmospheric contamination; and a conducting non-corrosive lower member which is secured to the lower surface of the insulator and is in electrical contact with the lower mounting means whereby to dissipate high electric fields which exist between the upper portion of the lower mounting means and the lower surface of the insulator, said lower member conforming to the shape of the lower surface of the insulator;

4,016,359

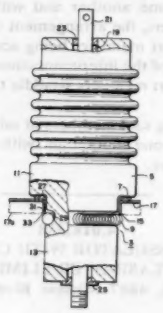
INSULATING BUSHING ASSEMBLY

James R. Gamble, Greensburg, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 28, 1975, Ser. No. 636,284

Int. Cl.² H01B *17/30*

U.S. Cl. 174—153 R **1 Claim**



1. An insulating bushing assembly extending through an aperture in a wall of electrical apparatus, comprising:

a. An electrically insulating bushing having an enlarged portion and a reduced portion and having an annular shoulder between said portions, the reduced portion extending through the aperture and having an annular groove spaced from the shoulder;

b. an elastic gasket between the shoulder and the wall;

c. an annular coil spring in the groove and having a cross sectional diameter greater than the depth of the groove and substantially less than the width of the groove at the surface of the reduced portion, and

d. the spring contacting a peripheral corner of the aperture on the side of the wall opposite the gasket and external of the reduced portion to enable the spring to roll on an inturned surface portion of the groove radially inwardly of the groove with the corner as the center of spring rotation into tight contact between the groove surface and the corner in response to expansion of the gasket, whereby the elastic gasket is retained in fluid-tight compression between the bushing and the wall.

4,016,360

SYSTEM FOR REMOTELY CHECKING EQUIPMENT

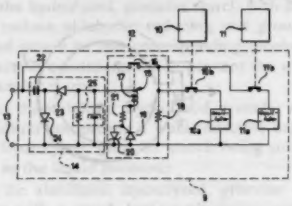
Mario Cane, V. Bussoleno 99, Leumann-Collegno, Italy 10096

Filed Dec. 30, 1975, Ser. No. 645,414

Claims priority, application Italy, Dec. 31, 1974, 70798-74

Int. Cl.² H04M *1/24, 11/00*

U.S. Cl. 179—2 A **8 Claims**



1. A system for remotely checking the operable condition of at least one piece of electrical equipment, the system comprising:

a switch means responsive to the operable condition of said one piece of electrical equipment;

an oscillator means for generating a distinctive low frequency electrical signal, its output being connected to said switch means;

a switching means in series with said switch means for selectively coupling and output signal from said oscillator means directly to a telephone line, said switching means including a controlled rectifier having a cathode, an anode and a control electrode, said anode and said control electrode being coupled respectively to the cathode and anode of a first diode, which is a Zener diode, said Zener diode having its anode connected, via a resistance, in series with an energizing coil of a relay forming at least part of said switching means;

means responsive to a call signal on the telephone line for effecting closing of said switching means upon arrival of a call signal; and

timing means for effecting opening of said switching means upon expiration of a given period of time subsequent to receipt of a call signal;

whereby a user may place a call signal on the telephone line and determine if the oscillator means is supplying a distinctive signal directly to the telephone line as an indication of the operable condition of the piece of equipment.

4,016,361

APPARATUS FOR STORING DATA BROADCAST IN DIGITAL FORM FOR GENERATING A CHARACTER DISPLAY OR FOR RECORDING SUCH DATA FOR LATER PLAYBACK

Kailash Narain Pandey, Cambridge, England, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Sept. 2, 1975, Ser. No. 609,654

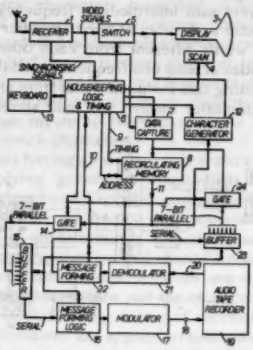
Claims priority, application United Kingdom, Sept. 26, 1974, 41965/74

Int. Cl.² H04N *5/76*

U.S. Cl. 358—83 **10 Claims**

1. Data handling apparatus for use in conjunction with a television receiver; said apparatus including means for selecting parts of a television signal received by said receiver, deriving data from said selected parts and applying said data at a high data rate to a main high speed storage means for the data; means for selectively reading data from said main storage means and for producing therefrom video signals for generating a legible display of the selected data; first buffer storage means for receiving data from the main storage means, a group of digits at a time; means for reading data at low speed from said buffer storage means and producing therefrom signals suitable for recording by a relatively low frequency

signal recorder; means for deriving data signals from signals from a relatively low frequency signal recorder; and second buffer storage means for receiving the derived data signals and



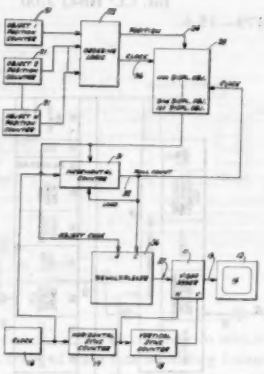
for producing therefrom data signals at a high data rate, a group of digits at a time, and for applying said digit groups to said main storage means.

4,016,362

MULTIPLE IMAGE POSITIONING CONTROL SYSTEM AND METHOD

Stephen D. Bristow, San Jose, and Steven T. Mayer, Auburn, both of Calif., assignor to Atari, Inc., Sunnyvale, Calif.

Filed Oct. 29, 1975, Ser. No. 626,665
Int. Cl.² H04N *5/22*; **G08B** *23/00*
U.S. Cl. 358—142 **16 Claims**



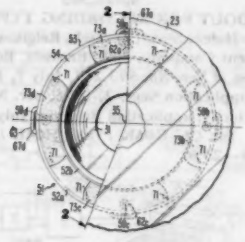
1. In a method of controlling the display of images of a plurality of objects at different locations on a video display screen scanned in successive frames by an image forming beam traversing the screen along a predetermined path, the steps of: providing data indicative of the locations at which the images are to be displayed during each frame, arranging the data for each frame according to the order of the image locations along the path of the beam, comparing the image location data with data corresponding to the position of the beam, and providing an output display signal when the position of the beam corresponds to the location at which an image is to be displayed.

4,016,363

METHOD FOR ADHERING COMPONENTS PLATFORM TO CATHODE-RAY TUBE AND PRODUCT THEREOF

Samuel Broughton Deal, Lancaster, and Donald Walter Bartch, Columbia, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 15, 1976, Ser. No. 667,109
Int. Cl.² H04M *5/64*
U.S. Cl. 358—248 **6 Claims**



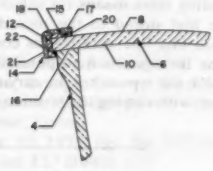
1. In a method for mounting an electronic component on an external surface of a cathode-ray tube comprising
   a. positioning a platform against said surface of said tube,
   b. applying at least one liquid thermoplastic mass between said platform and said surface,
   c. applying at least one liquid irreversibly-hardenable mass between said platform and said surface,
   d. solidifying said thermoplastic mass,
   e. mounting said electronic component on said platform after said thermoplastic mass has hardened,
   f. and completing the curing of said permanently-hardenable mass after said electronic component is mounted on said platform.

4,016,364

COLOR TELEVISION PICTURE TUBES WITH IMPROVED IMPLOSION PROTECTION SYSTEM

Melvin F. Rogers, Western Springs, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Oct. 20, 1975, Ser. No. 623,853
Int. Cl.² H01J *29/87*
U.S. Cl. 358—245 **6 Claims**



1. A color television picture tube having a glass bulb with an approximately rectangular, flangeless, curved faceplate having a convex front surface through which television pictures are viewed, a concave rear surface with a phosphor screen deposited on a portion thereof, and a peripheral edge surface connecting the convex front surface and the concave rear surface of the faceplate the peripheral edge surface being contoured, that is, having sides which depart from and return to a plane connecting the four corners of the faceplate, the glass bulb also having a funnel having a convex seal land which mates with the concave inner surface of the faceplate to define a contoured sealing interface, said tube including a low-cost edgebond implosion protection system comprising:
   a high tensile strength metal frame which surrounds said edge surface of said faceplate and which has a contour corresponding generally to that of said edge surface, i.e.,

a contour in which sides of the frame depart from and return to a plane connecting the four corners of the frame the direction of said departure being the same as for the faceplate edge surface; and

a cement between said frame and said edge surface of said faceplate, said frame and cement binding up said edge surface of said faceplate.

4,016,365

READOUT FOR RECORDING TYPEWRITER

Marcel Jules Helene Staar, Brussels, Belgium, assignor to Staar Development Company, S.A., Brussels, Belgium

Continuation of Ser. No. 593,217, July 7, 1975, abandoned. This application Sept. 2, 1975, Ser. No. 609,580

Claims priority, application Belgium, July 5, 1974, 817295

Int. Cl.[2] G06K *15/00*; **H04L** *13/00*

U.S. Cl. 178—23 R **16 Claims**

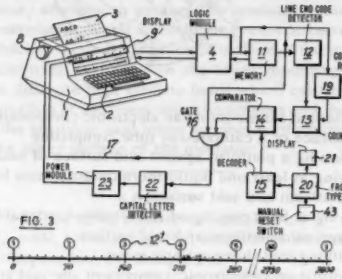


FIG. 3

1. In a recording typewriter having a keyboard, line control elements including a roller for carrying a sheet to be typed and adapted to be advanced or retarded for bringing a line into type position, a recording memory, and means coupling the memory and the typewriter for recording codes in the memory corresponding to multiple lines of typed characters and for typing characters corresponding to stored codes, the improvement comprising, an alpha numeric display having a plurality of character positions sufficient to display a complete line of type, means coupling the memory to the display and responsive to the stored codes for displaying the characters corresponding to a selected line of type, line selecting means operatively connected to the output of the recording memory for selecting a particular line of type to be displayed from multiple lines stored in the recording memory, said line selecting means further including reset means for selecting the first line of a multiple line text stored in the recording memory and for displaying said first line, and means connecting said line selecting means for operation responsive to said line control elements within the typewriter for varying the display line-by-line coincident with varying the position of the roller and sheet thereon.

4,016,366

COMPATIBLE STEREOPHONIC RECEIVER

Hirotaka Kurata, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan

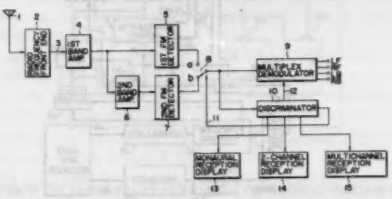
Filed July 14, 1975, Ser. No. 595,399

Claims priority, application Japan, July 17, 1974, 49-84683[U]

Int. Cl.[2] H04H *5/00*

U.S. Cl. 179—15 BT **8 Claims**

1. A compatible stereophonic receiver comprising a circuit for receiving a monaural signal, 2-channel stereophonic composite signal and multi-channel stereophonic composite signal transmitted in the frequency modulated form and generating an intermediate frequency signal including any of said signals; amplifier means for amplifying said intermediate frequency signal; frequency modulated wave detection means for detecting said included signal from the output of said amplifier means; and a multiplex demodulator coupled to said detection means and adapted to demodulate an audio signal included in any of said detected monaural signal, 2-channel stereophonic composite signal and multi-channel stereophonic composite signal, wherein said intermediate frequency signal amplifier means includes a plurality of band amplifier means each having a band width different from each other; said detection means includes at least one frequency modulated wave detector for detecting said included signal from an output of any of said band amplifier means; and said stereophonic receiver



further comprises a discriminator coupled to said frequency modulated wave detector to determine whether a signal received is a monaural signal, 2-channel stereophonic composite signal or multi-channel stereophonic composite signal, and means for selectively connecting a band amplifier means which has a band width corresponding to an output signal from the discriminator to said multiplex demodulator through a frequency modulated wave detector and for controlling said multiplex demodulator to demodulate an audio signal from the output of said frequency modulated wave detector.

4,016,367

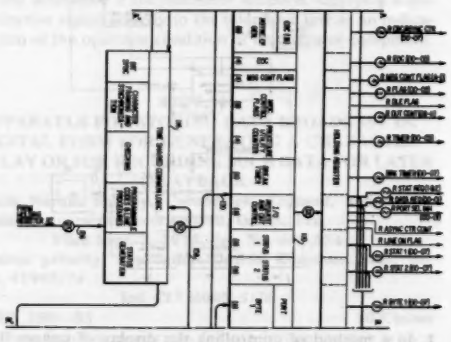
COMMUNICATION MULTIPLEXER MODULE

Wendell A. Law, Kaysville; William G. Barrett, Bountiful; Norman F. Priebe, and Harry D. Wise, both of Salt Lake City, all of Utah, assignors to Sperry Rand Corporation, New York, N.Y.

Filed Apr. 11, 1975, Ser. No. 567,480

Int. Cl.[2] H04J *3/00*

U.S. Cl. 179—15 A **11 Claims**



1. In a communications multiplexer module for transferring messages between a host computer and a plurality of line adapters, the improvement comprising:

a memory including a plurality of addressable storage locations, one for each of said line adapters, each said addressable storage location including,

a first storage means for temporarily storing each charac-

ter of a message as it is transferred between the computer and the associated line adapter, and

a second storage means for storing longitudinal redundancy check characters generated as a message is transferred through the multiplexer module;

a time shared modulo 2 adder means having first and second inputs connected to said memory for receiving said characters of said messages from said first storage means and said longitudinal redundancy check characters from said second storage means to thereby generate longitudinal redundancy check characters;

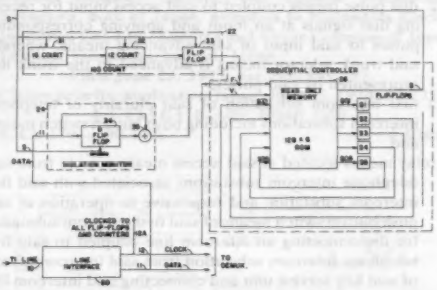
said adder means having an output connected to said memory for applying generated longitudinal redundancy check characters to said second storage means; and,

addressing means for addressing said addressable storage locations in a predetermined sequence, whereby the characters stored in the first and second storage means of a given addressable storage location are concurrently applied to said adder means and the characters stored in the first and second storage means of successive addressable storage locations are applied to said adder means in said predetermined sequence, and the longitudinal redundancy check characters generated by said adder means represent the longitudinal check characters for said messages from the beginning of said messages through and including the last one applied to said adder means.

4,016,368
FRAMING CIRCUIT FOR DIGITAL RECEIVER

Garrett Gordon Apple, Jr., Huntington Beach, Calif., assignor to North Electric Company, Galion, Ohio

Filed Dec. 12, 1975, Ser. No. 640,334
Int. Cl.² H04J *3/06*
U.S. Cl. 179—15 BS **16 Claims**



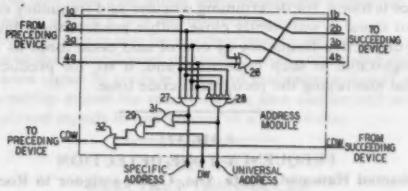
1. A framing circuit for a digital receiver in which received signals comprise a train of data bits including framing bits at regular intervals, said framing bits having a predetermined pattern, counting means to count said data bits and to produce a framing signal on a given count, violation monitor means to compare said framing bits with said predetermined pattern and to produce a violation signal upon detecting a deviation from said predetermined pattern, digital controller means operative in response to said framing and violation signals to detect and record said violation signals occurring with said framing signals, and further operative whenever a predetermined violation rate threshold is exceeded to re-established correct framing;

said digital controller means comprising a read only memory having at least one output lead and a plurality of input leads and digital storage means coupled between said output and input leads of said read only memory.

4,016,369
ADDRESSING ARRANGEMENTS FOR COMMUNICATIONS NETWORKS

Thomas Josef Pedersen, Lincroft, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 9, 1976, Ser. No. 665,171
Int. Cl.² H04Q *11/04, 3/04*
U.S. Cl. 179—15 AL **9 Claims**



1. A communication system comprising:

a main device and at least one plurality of associate devices, generating means at said main device for producing any one of a plurality of access messages, each one of the plurality of access messages uniquely corresponding to one of said associate devices in the plurality, wherein the improvement comprises:

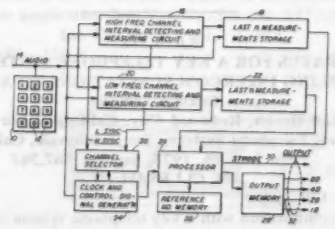
transforming means at each of said associate devices for changing the received one of the plurality of access messages in a predetermined manner to produce a changed access message corresponding identically to another one of the plurality of access messages and for applying the changed access message to a subsequent associate device, and

logical means, at each of said associate devices in circuit relationship with said transforming means, for responding to the same one of the plurality of access messages, each one of the plurality of said logical means being provided a different one of the plurality of access messages when said generating means issues one access message due to the individual operation of each of the plurality of said transforming means in changing its received access message so as to provide the unique correspondence of a particular associate device at said main device resulting from a number of transformations unique to each associate device.

4,016,370
DIGITAL TONE DECODER

Chansak Laoteppitaks, Orange; Lincoln Henthorn, Cheshire, and Charles B. Falconer, Hamden, all of Conn., assignors to Chestel, Inc., Chester, Conn.

Filed Mar. 19, 1975, Ser. No. 559,744
Int. Cl.² H04M *1/50*
U.S. Cl. 179—84 VF **23 Claims**



1. A decoder for use in a communication system wherein bits of information to be communicated are represented on a

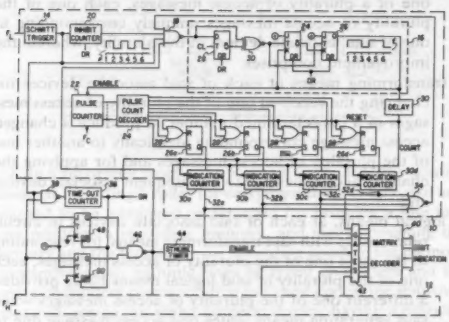
communication line by a plurality of code tones of distinctive frequencies each corresponding to a respective one of said bits of information, said decoder comprising means responsive to an input signal appearing on a communication line for detecting repetitive intervals dependent on the period of said input signal and for producing a digital measurement of the length of each of said intervals, means responsive to said digital measurements for determining whether said input signal has persisted at an acceptably steady frequency within predescribed limits for a predetermined time and, if such persistence is found, for determining whether said frequency of said input signal is sufficiently close within predescribed limits to the distinctive frequency of one of said code tones as to be recognizable as such code tone and, if so, for producing a signal identifying the recognized code tone.

4,016,371

FREQUENCY TONE DETECTION

Mohamad Hammad, Santa Ana, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 26, 1976, Ser. No. 652,596
Int. Cl.² H04M *1/50*
U.S. Cl. 179—84 VF **14 Claims**



1. A frequency detector for determining which one of a plurality of frequency bands, each consisting of at least one valid frequency, contains the frequency of a frequency tone signal, comprising:

a source of clock pulses having a known frequency which is greater than that of the highest possible valid frequency;

pulse counting means for counting the number of clock pulses generated during a counting interval on a repetitive basis, the duration of each counting interval being a function of at least one cycle of the frequency tone signal, and

indication counting means for maintaining a count for each of the frequency bands of the number of counting intervals that said pulse counting means has attained a value corresponding to a valid frequency therein and generating an output signal indicative of the first frequency band to have its associated count achieve a predetermined level.

4,016,372

APPARATUS FOR A KEY TELEPHONE SYSTEM FOR ENABLING INTERCOM SUBSTATIONS TO ACCESS TRUNK LINES

Steven Jon Hoehn, Redwood City, Calif., assignor to Litton Business Telephone Systems, Inc., Sunnyvale, Calif.

Filed June 16, 1975, Ser. No. 587,361
Int. Cl.² H04M *1/72*
U.S. Cl. 179—99 **5 Claims**

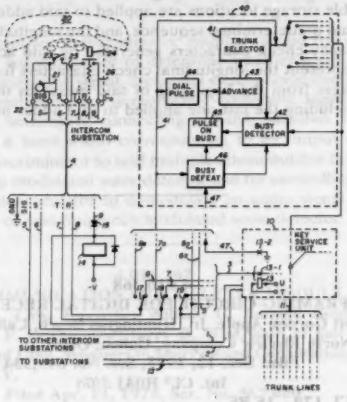
1. In combination with a key telephone system of the type having a plurality of telephone substations and a plurality of telephone intercom substations, said key telephone system having access to trunk telephone lines and having a key service unit for interconnecting said trunk lines with said telephone substations but not to said telephone intercom substations, an intercom circuit in said key service unit and intercom telephone lines extending between said intercom circuit and said telephone intercom substations, and audible signaling means and dial means at each of said intercom substations, and means in said key service unit of said telephone system for selecting a particular intercom substation and energizing said audible signaling means at said intercom substation, the improvement thereto comprising in combination:

intercom-to-trunk line access means coupled to said trunk lines and having an access input;

said access means including:

a. trunk selector means for coupling said input to trunk lines for establishing a communication channel between said input and one of said trunk lines;

b. advancing means responsive to pulses at an input for advancing said trunk selector means to one of said plurality of trunk lines; and



c. dial pulse means coupled to said access input for receiving dial signals at an input and applying corresponding pulses to said input of said advancing means, whereby said trunk selector means is advanced to the trunk line represented by said pulses;

a first intercom substation of said plurality of telephone intercom substations including push button switch means; and

relay means located at said access means remote from said telephone intercom substations associated with said first intercom substation and responsive to operation of said push button switch means of said first intercom substation for disconnecting an intercom line coupled to said first telephone intercom substation from said intercom circuit of said key service unit and connecting said intercom line in circuit to the input of said intercom to trunk line access means.

4,016,373

MULTICHANNEL RECORD DISC RECORDING SYSTEM

Yukinobu Ishigaki, Yamato; Isao Ohwaki, Tokyo, and Masahiro Ohba, Yokohama, all of Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed Sept. 25, 1975, Ser. No. 616,876
Claims priority, application Japan, Sept. 26, 1974, 49-109944; July 4, 1975, 50-81767
Int. Cl.² G11B *3/00*
U.S. Cl. 179—100.4 ST **6 Claims**

1. A multichannel record disc recording system comprising:

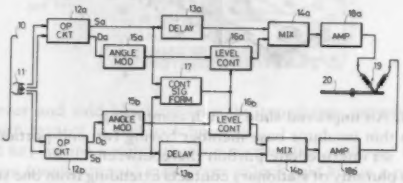
means for supplying first, second, third, and fourth channel signals;

operation means for forming a first sum signal and a first

difference signal responsive to the first and second channel signals and forming a second sum signal and a second difference signal responsive to the third and fourth channel signals;

means for angle modulating the first and second difference signals;

control signal forming means for forming a control signal responsive to detection of a condition wherein the level of at least one of the first and second sum signals is higher than a first specific level and a condition wherein the level of at least one of the first and second sum signals is lower than a second specific level, said second specific level being lower than the first specific level;



control means responsive to said control signal for increasing the levels of the angle-modulated first and second difference signals;

mixing for multiplexing the first sum signal and the first level controlled angle-modulated difference signal to produce a first multiplexed signal and for multiplexing the second sum signal and the second level controlled angle-modulated difference signal to produce a second multiplexed signal; and

recording means for cutting and recording the first and second multiplexed signals in a groove of a record disc.

4,016,374

MULTICHANNEL RECORD DISC RECORDING SYSTEM WITH SIGNAL LEVEL CONTROL

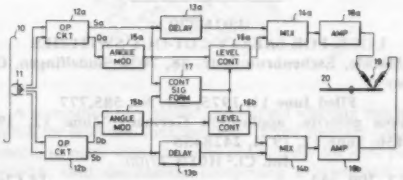
Yukinobu Ishigaki, Yamato, and Hiroshi Matsushima, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma and Victor Company of Japan, Limited, Yokohama, both of, Japan

Filed June 23, 1975, Ser. No. 589,557

Claims priority, application Japan, June 25, 1974, 49-72542

Int. Cl.² G11B *3/00*; H04H *5/00*

U.S. Cl. 179—100.4 ST **6 Claims**



1. A multichannel record disc recording system comprising:

means for supplying first, second, third and fourth channel signals;

first operating means for forming a first sum signal and a first difference signal responsive to the first and second channel signals;

second operating means for forming a second sum signal and a second difference signal responsive to the third and fourth channel signals;

first modulating means for angle-modulating said first difference signal;

second modulating means for angle-modulating said second difference signal;

control signal forming means for forming a control signal responsive to a level of at least one of said first and second sum signals exceeding a predetermined level;

first level control means responsive to said control signal for controlling the level of the first angle-modulated difference signal;

second level control means responsive to said control signal for controlling the level of the second angle-modulated difference signal;

first mixing means for multiplexing the first sum signal and the first level controlled angle-modulated difference signal to obtain a first multiplexed signal;

second mixing means for multiplexing the second sum signal and the second level controlled angle-modulated difference signal to provide a second multiplexed signal; and

recording means for recording the first and second multiplexed signals in one groove of a record disc.

4,016,375

ELECTRET TRANSDUCER

Jan Van Turnhout, Delft, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 11, 1975, Ser. No. 557,274

Claims priority, application Netherlands, Mar. 15, 1974, 7403471

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² H04R *19/00*; H01G *7/02*

U.S. Cl. 179—111 E **4 Claims**

1. An electrostatic transducer comprising, at least two electrodes, which are disposed opposite each other, of which one electrode forms part of a vibratory diaphragm and of which the other electrode is fixed, a disc of electret material being disposed between the electrodes and at one of the electrodes, characterized in that the electret material comprises a copolymer of tetrafluoroethylene and perfluorine (alkylvinylether), in which the alkylgroup contains from 1 to 5 carbon atoms.

4,016,376

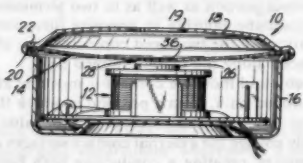
CONCAVE DIAPHRAGM FOR ELECTRO-ACOUSTIC TRANSDUCER

Jacob Neuhof, Bridgeport, Conn., assignor to General Signal Corporation, Stamford, Conn.

Continuation of Ser. No. 538,999, Jan. 6, 1975, abandoned. This application Jan. 8, 1976, Ser. No. 647,633

Int. Cl.² H04R *7/22*, *13/00*

U.S. Cl. 179—115 R **7 Claims**



1. An electro-acoustic transducer, comprising

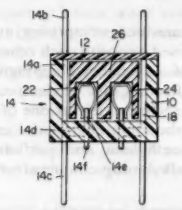
a source of oscillatory current;
driving means connected to said source, including a magnetic core, and at least one winding around said core;
a diaphragm of magnetic material suspended so as to establish a concave configuration as the normal or neutral point for operation in response to said source of oscillatory current, the center of said diaphragm being adjacent one end of said core so as to define an air gap, said diaphragm being responsive to said driving means to produce an audible signal;
a casing for said transducer, said casing including a lower housing and a cover, and means on said lower housing and said cover for cooperatively mounting said diaphragm at its periphery, said means for cooperatively mounting said diaphragm including a flange, at the rim of said lower housing, inclined downwardly from the horizontal toward the center of the housing and at an angle of approximately 10°, and an inclined section in said cover which abuts the said flange and which is formed likewise at an angle of approximately 10° from the horizontal, thereby to hold the diaphragm between said flange and said inclined section in said cover so as to force the diaphragm into the aforesaid concave configuration, said diaphragm remaining in said concave configuration but being free to move in its entirety above said neutral point due to the lack of any restraining mechanical force imposed upon the diaphragm at or near its center.

4,016,377

SLIDE SWITCH ASSEMBLY HAVING IMPROVED FIXED KNIFE BLADE TYPE CONTACT STRUCTURE

Sadayoshi Iwasaki, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed May 19, 1975, Ser. No. 578,482
Claims priority, application Japan, May 21, 1974, 49-57630
Int. Cl.² H01H *15/04, 1/42*
U.S. Cl. 200—16 F **17 Claims**



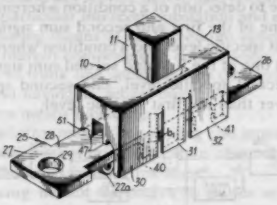
1. A switch comprising
a housing;
a holder slideably supported in the housing;
a movable contact set into the slideable holder and movable along a predetermined path, said movable contact having a contact portion of two opposed internal surfaces;
two fixed contacts fixed in place by the housing, each fixed contact having a contact portion of two opposed external contact surfaces and a lead portion connected to the contact portion as well as to two terminals which extend beyond the housing in opposite directions, the contact portions of the two fixed contacts being aligned with and spaced along the predetermined path;
whereby said movable contact is movable along the predetermined path, from a position in which the two opposed internal contact surfaces of the movable contact ohmically engage the external contact surfaces of the two fixed contacts, creating a conducting path between the fixed contacts, to a position in which the fixed contacts are disconnected.

4,016,378

DETENT MEANS FOR SIMPLIFIED SLIDE SWITCH

Ronald H. Arthur, Fort Lauderdale, Fla., assignor to AMF Incorporated, White Plains, N.Y.

Filed Mar. 9, 1976, Ser. No. 665,284
Int. Cl.² H01H *15/04, 9/02*
U.S. Cl. 200—16 D **11 Claims**



1. An improved slide switch comprising
a thin insulator base member having two end portions and an intermediate portion therebetween,
a plurality of stationary contacts extending from one surface of the base member in said intermediate portion,
a plurality of terminal means for said stationary contacts,
a sliding member formed as a unitary plastic piece having an upper portion extending transversely of the intermediate portion of said base member and including on two sides thereof yieldable side skirts adapted to extend downwardly over the side edges of said intermediate portion of the base member,
barbs or latch elements at the bottom portions of said skirts for slidingly engaging the opposite surface of the base member to maintain said sliding member and base member in operable relationship,
a movable contact member disposed between the sliding member and said stationary contacts and operable in response to the sliding motion of the sliding member for selectively making and breaking contact with said stationary contacts,
boss means and boss receiving means, one of which is associated with at least an edge of said base member and the other one being associated with said yieldable side skirts,
said boss means and boss receiving means being constructed and arranged to be in registration with each other when the sliding member is in at least one desired switching position, and registration between the boss means and boss receiving means being interrupted due to yielding of at least one side skirt during motion of the sliding member away from said one desired switching position.

4,016,379

LOCK FOR SAFETY CUT-OUT SWITCHES

Paul Merkle, Eschenbrunnlestr. 48, 7032 Sindelfingen, Germany

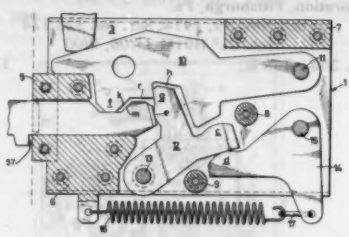
Filed June 11, 1975, Ser. No. 585,777
Claims priority, application Germany, June 12, 1974, 2428456; June 12, 1974, 2428458
Int. Cl.² H01H *27/00*
U.S. Cl. 200—44 **14 Claims**

1. A lock for a safety cut-out switches comprising
a lock housing,
a locking member within said housing engageably cooperating with the cut-out of the switch to lock the switch in a desired operational condition,
a main lever within said housing pivotally arranged to move said locking member to its locked position and having a motion tongue thereon,
a blocking lever within said housing pivotally arranged and spring loaded to block the motion of said main lever when said main lever is in its locking position,
said main lever being further arranged to block the rotation of said blocking lever when said main lever is in its unlocking position,

said blocking lever having shaped portions thereon which control the unlocking movement of said main lever with the pivotal motion of said blocking lever, and

a key which actuates the pivotal movement of said main lever and said blocking lever by translation movement with respect to said lock housing,

said key having a notch thereon cooperating with said motion tongue on said main lever to lock said key in a position corresponding to the non-locked state of the lock.



4,016,380

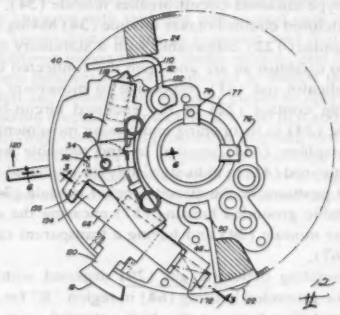
TURN SIGNAL AND HAZARD WARNING CONTROL APPARATUS FOR UNITARY INSERTION INTO VEHICLE STEERING COLUMN BODY

Terry Kyle Schawinsky, South Lyon; Walter Strobl, Brighton, and Melvin William Polkinghorn, Livonia, all of Mich., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 21, 1975, Ser. No. 606,556

Int. Cl.² H01H *3/16, 9/00*

U.S. Cl. 200—61.27 **5 Claims**



1. A combined turn signal and hazard warning mechanism adapted for insertion into the body of the steering column of a vehicle to mate with a turn lever assembly for joint pivoting therewith, said mechanism comprising a segmental walled member includng a plurality of electrical contacts and a common contact operating member operative in one direction responsive to pivotal movement of a turn signal handle of said assembly to open and close certain of said contacts and operative in another direction responsive to slide movement of a harzard warning handle to open and close certain other of said contacts, said hazard warning handle and said turn signal handle being axially spaced about said column in one quadrant thereof and in separate planes along the height of said column, means for translating the pivotal movement of said lever into reciprocal slide movement of said contact operating member, said translating means including a driving member constrained to pivotal movement, and a driven member constrained to sliding movement, an arm of said driving member engaging said driven member to slide said driven member in a first direction, a restoring spring responsive to pivotal movement of said lever in a reverse direction for sliding said driven member in the direction opposite said first direction to either a restored position with said contacts open or to an opposite position with certain of said contacts operated dependent on the position of said turn handle and said driving member.

4,016,381

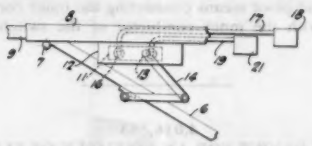
SWITCH ARRANGEMENT FOR DOOR CLOSERS

William G. Rodseth, Princeton, Ill., assignor to Schlage Lock Company, San Francisco, Calif.

Filed July 25, 1975, Ser. No. 599,067

Int. Cl.² H01H *3/16*

U.S. Cl. 200—61.62 **10 Claims**



1. In a door closer having a housing, a rod and a rod extension rotatable in said housing about an axis, and means effecting rotation of said rod and said rod extension relative to said housing in accordance with the relative position of a door panel and a door frame on which said door closer is mounted, the combination of an electrically insulated switch casing, means for securing said switch casing to said housing around said axis, an electrically insulated rotor disposed in said casing and engaging said rod extension with a predetermined friction slip fit transmitting torque therebetween only up to a predetermined maximum, at least one pair of electrical contacts in said casing exposed to said rotor and having a notch between them, and a conducting body movable on said rotor and in one position of said rotor in said casing disposed in said notch and in engagement with said pair of electrical contacts and in another position of said rotor in said casing disposed out of engagement with said pair of electrical contacts.

4,016,382

TRAVELLING SWITCHING BLOCK FOR METALLIC ENCAPSULATED HIGH VOLTAGE SWITCHING INSTALLATION

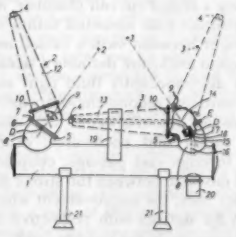
Adrian W. Roth, Aarau, Switzerland, assignor to Sprecher & Schuh AG, Switzerland

Filed Oct. 15, 1974, Ser. No. 515,041

Claims priority, application Switzerland, Oct. 5, 1973, 15517/73

Int. Cl.² H01H *33/54*

U.S. Cl. 200—148 R **8 Claims**



1. A travelling switching block for metallic encapsulated high-voltage switching installations wherein to a switching block housing there are joined together into a metal encapsulated insulated and transportable structural unit at least one input duct and one output duct, the switching block being

filled with insulating medium, the improvement comprising pivot means connecting each duct to the housing, each said duct extending upwardly in an operating position from the block housing and being movable by said pivot means into a transport position providing a small transverse profile, said pivot means including sealing means for sealing the respective duct against loss of insulating medium, each duct being supported by said pivot means such that in the transport position the duct is located at the lengthwise side of the switching block housing in the transport position, said pivot means further including a rotatable ring disk, and a stationary ring disk secured to the block housing and supporting the rotatable ring disk, said rotatable ring disk including a housing portion to which said duct is secured, each duct including an inner conductor, said switching block housing also including an inner conductor, and a coupling contact arranged in a pivot plane of said pivot means connecting the inner conductor of the duct with the inner conductor of the switching block housing.

4,016,383

SEALING DEVICE FOR AN ASSEMBLY OF ELEMENTS OF HIGH-VOLTAGE CUT-OUT DEVICES

Dante Nicoloso, Meyzieu, France, assignor to Delle-Alsthom, Villeurbanne, France

Filed May 2, 1975, Ser. No. 574,142

Claims priority, application France, May 20, 1974, 74.17453

Int. Cl.² H01H *33/82*

U.S. Cl. 200—148 F **5 Claims**

1. In a high-voltage cut-out device including a first enclosure forming a sealed cut-out chamber, mobile elements integral with contact rods mounted within said cut-out chamber for movement between switch closed and switch open positions, a second enclosure defining a sealed auxiliary chamber, means for disconnectedly fluid tight mounting of said first enclosure onto said second enclosure and forming a communication passage therebetween and disconnectable linkage mounted within said enclosures, extending between said chambers through said passage, coupled to said mobile elements and movable between full stroke positions for operating said contact rods; the improvement wherein:

said linkage defines with respective enclosures orifices at said communication passage, and

seals are carried by said linkage for closing off said orifices to effect a fluid tight seal between said linkage and said enclosures at one linkage full stroke position to permit separation of one enclosure from the other and disconnection of said linkage between said enclosures without loss of seal of either chamber.

4,016,384

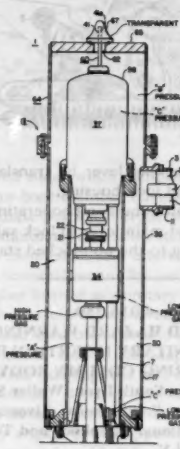
OPERATING MECHANISM AND POSITION INDICATOR FOR A CIRCUIT INTERRUPTER

Charles E. LeRow, Jr., Jeannette, and Ronald W. Crookston, Trafford, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 19, 1974, Ser. No. 525,124

Int. Cl.² H01H *33/00, 9/00*

U.S. Cl. 200—148 R **12 Claims**



1. A power-transmission circuit-breaker installation comprising, in combination:

a. a gas-type enclosed circuit-breaker module (**34**);

b. said enclosed circuit-breaker module (**34**) having a movable contact (**22**) cooperable with a stationary contact (**21**) to establish an arc and open the connected circuit;

c. an indicator-rod (**41**) responsive to movement of the movable contact (**22**) of the enclosed circuit-breaker module (**34**) in its opening and closing movements;

d. a semaphore (**41***a*) secured to and movable with the indicator-rod (**41**) to indicate visibly the open and closed-circuit positions of the circuit-breaker module (**34**);

e. a metallic grounded housing (**17**) encasing the circuit-breaker module (**34**) and having a transparent cap-portion (**67**);

f. an insulating dielectric gas (**20**) disposed within said metallic grounded housing (**64**) in region "B" for dielectric insulation between the high-potential parts of the circuit-breaker module (**34**) and the outer surrounding metallic grounded housing (**64**);

g. said indicator-rod (**41**) projecting at times within said transparent cap-portion (**67**);

h. said circuit-breaker module containing gas at a different high-pressure level A than the pressure-level of the gas within said housing B;

i. a generally tubular insulating housing (**50**) surrounding the indicator-rod (**41**) and gas-sealed to the circuit-breaker module (**34**), at a relatively-low-gas pressure level C which is lower than gas pressure level A, so that any gas from the circuit-breaker module at relatively low-gas pressure level C which creeps axially along the indicator-rod (**41**) during its linear longitudinal opening and closing motion will not be allowed to enter the gas-region B within the outer metallic grounded housing (**17**) encasing the circuit breaker module; and,

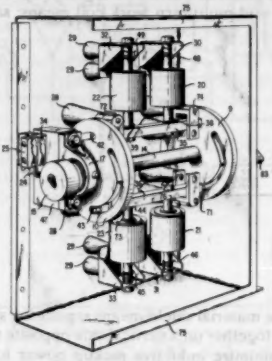
j. said indicator-rod (**41**) movable longitudinally at all times within said tubular gas-sealed insulating housing (**50**).

4,016,385

HIGH VOLTAGE TRANSFER SWITCH WITH CAM CONTROLLED OVERLAP DURING TRANSFER

Igor Golioto, Fairfield, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 8, 1975, Ser. No. 620,643
Int. Cl.² H01H *3/42, 33/66*
U.S. Cl. 200—153 L 7 Claims



1. A transfer switch to selectively couple output terminal means to accept a load to first and second input terminal means to accept a first and second high voltage power source respectively comprising first electric contact means to interconnect said first input terminal means to said output terminal means, second electrical contact means to interconnect said second input terminal means to said output terminal means, means to operate said first and second electrical contact means including cam wheel means, rotatable shaft means to support said cam wheel means, said cam wheel means including first and second cam slots, first and second cam follower means engaged with said first and second cam slots, respectively, constraining means to constrain said first and second cam follower means to have linear motion, said first and second cam follower means connected to impart the motion of said first and second cam follower means to operate said first and second electrical contact means, said first and second cam slots having coordinated profiles so that said first and second follower bars are linearly displaced in sequence whereby one of said first and second electrical switches is engaged before the other of said electrical switches is subsequently disengaged.

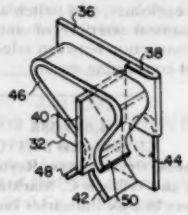
4,016,386

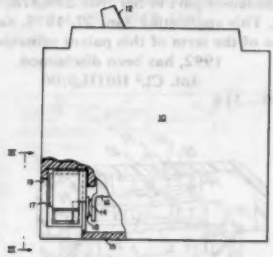
CIRCUIT BREAKER LINE TERMINAL

Francis L. Gelzheiser, Fairfield, Conn., and Gerald J. DeAngelo, Ballwin, Mo., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 8, 1975, Ser. No. 603,073
Int. Cl.² H01H *1/50, 1/42*
U.S. Cl. 200—250 5 Claims

1. A circuit breaker for use with a panel board, comprising an insulating housing including an opening in an edge wall thereof, a circuit breaker mechanism within the housing and comprising stationary and movable contacts, a plug-in-type terminal structure, the terminal structure being positioned near the opening and resiliently engageable with a stab on the panel board, the terminal structure comprising a terminal, a single integral flange on the terminal, a spring clip on the flange for holding a stab in good electrical contact against the flange when the circuit breaker is mounted on the panel board, the stationary contact being mounted on the terminal, the flange being aligned with the opening, and the spring clip





comprising resilient legs on opposite sides of the flange with the ends of the legs facing the opening.

4,016,387

SNAP TOGETHER SWITCH ASSEMBLY

James B. Aberer, Lake Winnebago, Mo., assignor to Rival Manufacturing Company, Kansas City, Mo.

Filed June 9, 1975, Ser. No. 584,897
Int. Cl.² H01H *3/08*
U.S. Cl. 200—303 3 Claims

1. An electric switch assembly comprising:

a first housing section having a plurality of spaced projections extending laterally therefrom, each projection having a pair of opposite sides and an underside;

a second housing section connected to said first housing section and cooperating therewith in defining an enclosure, said second housing section presenting a plurality of pairs of shoulders overlying the respective projections;

a plurality of generally U-shaped clips each having a web extending along said underside and a pair of legs extending from said web along said opposite sides, each clip further including a pair of flanges projecting from said legs and substantially flatly engaging the respective pairs of shoulders to rigidly connect said first and second housing sections together;

a plurality of electrical contacts comprised of current conducting material, one of said contacts being adapted for connection to a power source;

means securing said contacts in stationary positions within said enclosure; and

a switch actuator having current conducting means located within said enclosure, said switch actuator being accessible for adjustment exteriorly of said enclosure to establish electrical connection between selected contacts through said current conducting means.

4,016,388

KEYBOARD SWITCH

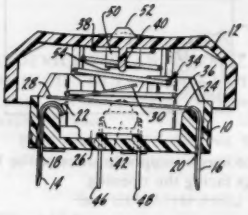
Bernard J. Golbeck, Crystal Lake; Raymond F. Lewandowski, Mt. Prospect, and William C. Markinson, Crystal Lake, all of Ill., assignors to Oak Industries Inc., Crystal Lake, Ill.

Division of Ser. No. 383,385, July 27, 1973, abandoned, which is a continuation-in-part of Ser. No. 279,378, Aug. 10, 1972, abandoned. This application Jan. 27, 1975, Ser. No. 544,368

The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.

Int. Cl.² H01H 9/00

U.S. Cl. 200—314 **8 Claims**



1. A pushbutton switch including a base, a button, cooperating means on said button and said base for mounting said button for telescopic movement toward and away from said base, spring means positioned between said button and said base and normally biasing said button away from said base, a pair of terminals extending outwardly from the base, one of said terminals supporting a relatively thin substantially flat flexible cantilever contact arm positioned within the base, said contact arm extending to a position immediately adjacent the other terminal and having an area disposed for contact with said other terminal, said contact arm having a relatively thin substantially flat flexible cantilever portion which extends outwardly from adjacent said area toward the button, means on the button positioned to contact said arm portion and apply force thereto in the direction of button movement and thus move said arm into contact with the other terminal when the button is moved relative to the base, said contact arm and arm portion having generally uniform flexibility over their entire path of movement, with said arm area beginning its movement toward said other terminal substantially simultaneously with initial engagement of said button means and said arm portion, the application force of the button being distributed along the cantilever arm portion and the cantilever contact arm, with the combined length of the cantilever arm portion and cantilever contact arm being greater than the distance between said terminals,

light indicating means mounted on the base, and light display means mounted on the button in alignment with the light indicating means on the base.

4,016,389

HIGH RATE ION PLATING SOURCE

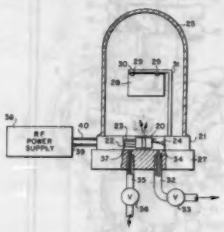
Gerald W. White, 5835 Elm Lawn St., Dallas, Tex. 75228

Filed Feb. 21, 1975, Ser. No. 551,703

Int. Cl.² H05B 5/18

U.S. Cl. 219—10.49 **20 Claims**

1. In an ion generating source within a controlled environment enclosure for high particulate energy level ion plating deposition of plating material on substrates: multi-turn work coil means; power supply conductive two-line means for interconnecting RF power supply means and opposite ends of said multi-turn work coil means; said multi-turn work coil means being constructed to contain an inductive magnetic field variation responsive material susceptor within the center of said multi-turn work coil means; support means for said susceptor; an RF power supply voltage potential reference source physically connected to said multi-turn work coil means; electrically conductive material shield means generally circumferentially enclosing said multi-turn work coil means; said electri-



cally conductive material shield means separation split on one side and joined together on a vertical side opposite the separation split, to minimize inductive pickup power loss, and to inhibit coupling of RF into surrounding plasma, other than to vaporized material, where desired, above the susceptor; said electrically conductive shield means being insulated from said RF power supply voltage potential reference source and also insulated from said power supply conductive two-line means, to float, relative to RF power input and relative to said RF power supply voltage potential reference source.

4,016,390

INDUCTION HEATING APPARATUS WITH PROTECTIVE CIRCUIT ARRANGEMENT

Keizo Amagami; Takao Kobayashi; Yoshio Ogino, and Mitsuyuki Kiuchi, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Division of Ser. No. 415,542, Nov. 14, 1973, abandoned. This application May 22, 1975, Ser. No. 579,897

Claims priority, application Japan, Nov. 15, 1972, 47-114990; Nov. 16, 1972, 47-115378; Nov. 17, 1972, 47-115809; Nov. 20, 1972, 47-116923; Aug. 10, 1973, 47-90404

Int. Cl.² H05B 5/04

U.S. Cl. 219—10.49 **2 Claims**

1. An induction heating apparatus comprising:

a power supply circuit including a rectifier coupled to an alternating current power source for generating a full-wave rectified unfiltered unidirectional excitation potential;

a switching circuit including a gate-controlled switching device and a unidirectional conducting device connected in inverse parallel relation to said gate-controlled switching device;

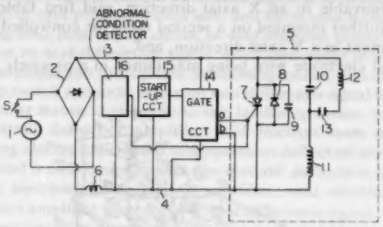
a commutating circuit connected to said switching circuit and including an induction heating coil and a commutating capacitor connected to the excitation potential to charge and discharge electrical energy through said induction heating coil and said switching circuit, said commutating circuit having a resonant frequency;

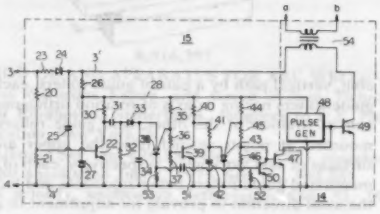
a gating circuit for gating on said gate-controlled switching device at a frequency substantially equal to the resonant frequency of said commutating circuit to allow said commutating capacitor to charge and discharge at this frequency to generate oscillation current which drives said induction heating coil;

means for detecting the zero voltage points of the full-wave rectified unfiltered unidirectional excitation potential;

inhibit means for inhibiting operation of said gating circuit;

a discharge circuit responsive to said detecting means for discharging said commutating capacitor when a predetermined number of detected zero voltage points is reached; and means operable upon the predetermined number of





the detected zero voltage points being reached to allow a predetermined interval for causing said inhibit means to be disabled so that said gating circuit is operated to charge said commutating capacitor to a level sufficient to generate said oscillation current.

4,016,391

INDUCTION HEATING APPARATUS WITH MEANS FOR IMPROVING THE DV/DT CAPABILITY OF A SILICON-CONTROLLED RECTIFIER USED THEREIN

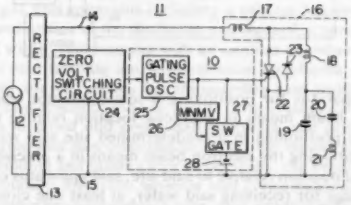
Mitsuyuki Kiuchi, and Takumi Mizukawa, both of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed June 13, 1975, Ser. No. 586,621

Claims priority, application Japan, June 18, 1974, 49-70016; June 19, 1974, 49-70626; July 10, 1974, 49-79652

Int. Cl.² H05B *5/04*

U.S. Cl. 219—10.49 **4 Claims**



1. The method of providing a high dv/dt capability of a silicon-controlled rectifier of a static power converter, wherein the dv/dt is the rate of rise of forward voltage applied to the anode of said silicon-controlled rectifier and wherein the control gate thereof is supplied with positive gating pulses at an ultrasonic frequency to generate a forward commutating current which drives an induction heating coil of an inverter at said ultrasonic frequency, comprising, detecting the cessation of said forward commutating current, setting a flip-flop device to an ON state upon the detection of the cessation of said forward commutating current, resetting said flip-flop device to the OFF state by said positive gating pulses, and applying a negative potential to the control gate of the silicon-controlled rectifier with respect to the cathode during the ON state of said flip-flop device.

4,016,392

PAN DETECTOR FOR INDUCTION HEATING APPARATUS

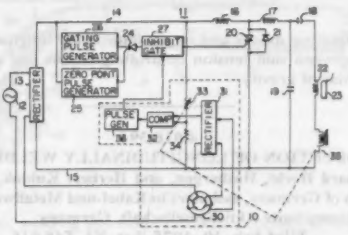
Takao Kobayashi; Keizo Amagami; Takumi Mizukawa, and Tadao Toyooka, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Jan. 28, 1975, Ser. No. 544,845

Claims priority, application Japan, Feb. 5, 1974, 49-15142

Int. Cl.² H05B *5/04*

U.S. Cl. 219—10.49 **5 Claims**



1. An induction heating apparatus comprising, a resonant circuit including an induction heating coil inductively coupled in operation to an inductance load; means including a gate-controlled switching device and a unidirectional conducting device connected in inverse parallel relation therewith, for supplying said resonant circuit with current pulses to cause resonance in said resonant circuit at a frequency sufficient to cause heating of the inductance load coupled to said heating coil; detecting means for generating a first signal indicative of the magnitude of the inductive coupling between said inductance load and the heating coil; comparing means for generating a second signal when the first signal reaches a variable reference level; manual adjusting means for permitting the adjustment of the inductive coupling at a desired value; means for varying the variable reference level in accordance with the adjustment of the inductive coupling; and means responsive to the second signal for enabling said current pulse supplying means at intervals which are sufficiently long so that no significant heating occurs in said inductance load.

4,016,393

SYSTEM FOR LAYING PIPE

J. C. Birdwell, Houston, Tex., assignor to Midcon Pipeline Equipment Co., Houston, Tex.

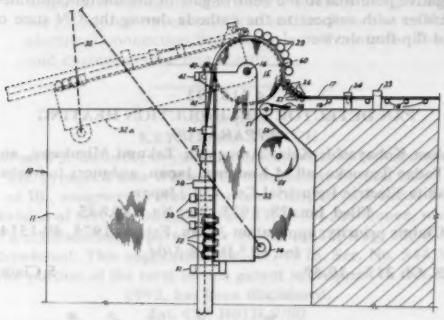
Filed Feb. 19, 1975, Ser. No. 550,943

Int. Cl.² B23K *31/06;* **B63B** *35/04*

U.S. Cl. 219—59 **47 Claims**

1. Apparatus for continuously discharging pipe from a traveling support, comprising means supported by said traveling support for longitudinally conveying a continuous horizontally disposed flat metal strip of uniform width in a generally horizontal direction, means disposed at the discharge from said conveyor means for receiving the discharged strip and for controlling the tension of said discharged strip beyond said tension controlling means, means for directionally directing said discharged strip from said traveling support with said discharged strip being drawn from said tension controlling means by gravity, said directional directing means being adjustable to any angle between an upper horizontal position and a lower vertical position so that said strip may be directed from said traveling support in any direction from a horizontal outward direction to a vertical downward direction, and

means for forming and welding said discharged strip into a pipe while said discharged strip is directionally directed by



said directing means and in predetermined longitudinal tension between said tension controlling means and the downward bias of gravity.

4,016,394

PRODUCTION OF LONGITUDINALLY WELDED PIPE

Meinhard Hecht, Hasbergen, and Herbert Kubiak, Misburg, both of Germany, assignors to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Germany

Filed Feb. 10, 1975, Ser. No. 548,616

Claims priority, application Germany, Feb. 8, 1974, 2406000

Int. Cl.² B23K *31/06*

U.S. Cl. 219—61 **7 Claims**

1. A process for producing longitudinally welded pipe from a metal strip wherein the metal is selected from the group consisting of copper and its alloys, comprising:

cleaning oxide from at least the edges of the metal strip with a hydrazine compound; washing the strip to remove remaining hydrazine compound; forming the strip into a pipe; are arc welding the formed pipe to produce the longitudinally welded pipe.

4,016,395

WIRE ELECTRODE FEED SYSTEM FOR ELECTRICAL DISCHARGE MACHINING

Frank P. Rietveld, Matthews, N.C., assignor to Colt Industries Operating Corporation, New York, N.Y.

Filed Dec. 12, 1974, Ser. No. 532,200

Int. Cl.² B23P *1/08*

U.S. Cl. 219—69 W **5 Claims**

1. In an electrical discharge machining apparatus including a machine tool having a head which provides machining of a workpiece by means of a conductive electrode wire, the combination comprising:

a supply reel for the wire mounted in a freely rotatable manner on said machine tool;

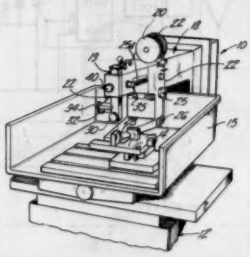
a plurality of guide rollers for retaining and transporting said wire in a continuous path to provide a cutting movement relative to the workpiece;

a pair of opposed rollers biased one toward the other, one driven and the other driving, to provide a constant and uniform pulling force on the wire to provide its continuous movement through said path as machining progresses;

a means operably connected to said driven roller for rocking it out of its juxtaposed position relative to said driving roller to provide clearance therebetween and allow for initial threading of the electrode wire;

said workpiece being mounted on a first table controllably movable in an X axial direction, said first table being further mounted on a second table for controlled movement in a Y axial direction; and

said electrode wire being maintained in a precisely adjustable, vertical path by a pair of guide rollers, each of said guide rollers having its axis of rotation orthogonal to the axis of rotation of the other, said guide rollers further mounted at points spaced from the upper and lower surfaces of said workpiece, respectively, each of said last mentioned guide rollers being adjustable and lockable in the axial direction to provide for adjustment to a precise degree of the vertical path of said wire proximate to said workpiece.



4,016,396

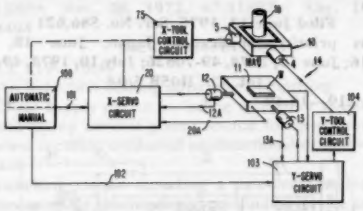
PRECISION TOOL AND WORKPIECE POSITIONING APPARATUS

Javathu K. Hassan, Hopewell Junction, and Carl V. Rabstejnek, Wappingers Falls, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Division of Ser. No. 395,890, Sept. 10, 1973, Pat. No. 3,904,945. This application Apr. 24, 1975, Ser. No. 571,167

Int. Cl.² G05B *11/18*

U.S. Cl. 219—121 EB **2 Claims**



1. Apparatus for positioning a semiconductor wafer and electron beam means in a precise location relative to each other by positioning in a predetermined site said wafer and then positioning the electron beam means in a precise predetermined position relative to said site, said apparatus comprising: a stage for receiving said wafer, at least one closed loop servo system connected to said stage, positioning means for positioning said stage in a predetermined site, said positioning means including a motor for moving said stage in a predetermined line of movement; position indicating means for determining the actual position of said wafer relative to a fixed reference, and a signal output from said position indicator means indicative of said actual position of said wafer at any one time; an error generator, and means for providing to said error generator the desired position of said wafer relative to said reference; and means for inputting said error generator with said signal output from said position indicator means, and

means in said error generator to produce a difference signal therefrom indicative of the difference between the actual position of said wafer and the desired position of said wafer; and means responsive to said difference signal to actuate said positioning means until said difference signal is such that said wafer is in said predetermined site; and latch stop means for latching said positioning means in said stopped position responsive to said difference signal when said wafer is in said predetermined site to stop said positioning means, and including stop switch means to interrupt said difference signal to said positioning means in response to said latch stop means, and an electrostatic deflection amplifier; said electron beam means including electrostatic deflection means to deflect an electron beam, and means coupling said electrostatic deflection means to said electrostatic deflection amplifier; said electrostatic deflection amplifier responsive to said difference signal, when said positioning means has stopped, to effect movement of said electron beam until said difference reaches a predetermined second lower value to thereby effect precise positioning of said electron beam relative to said wafer.

4,016,397

METHOD OF AND APPARATUS FOR ARC WELDING

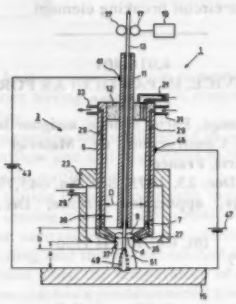
Wilhelmus Gerardus Essers, and Gerrit Willem Tichelaar, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 426,958, Dec. 20, 1973, abandoned. This application July 1, 1975, Ser. No. 592,351

Claims priority, application Netherlands, Oct. 31, 1973, 7314927

Int. Cl.² B23K *9/00*

U.S. Cl. 219—121 P **6 Claims**



1. In a plasma arc welding apparatus operable with a workpiece, welding wire, current supply means and a source of plasma gas, the apparatus including a tubular housing with a nozzle and orifice at the discharge end thereof, a contact tube situated within said housing with an annular chamber defined between said housing and contact tube for plasma gas flow from said source, means for transporting said welding wire through said contact tube and nozzle orifice, said contact tube having a terminal end positioned upstream said orifice, and consumable and non-consumable electrode means for establishing welding and plasma arcs respectively, the improvement in combination therewith wherein said consumable electrode means comprises said contact tube, said welding wire extending from said tube, said current supply means in circuit with said tube, wire and said workpiece for establishing said welding arc between said extending welding wire and said workpiece, and said non-consumable electrode means is a single non-consumable electrode comprising a copper nozzle, means for cooling said nozzle, and said current supply means in circuit with said workpiece for establishing said plasma arc between said nozzle and said workpiece, said nozzle orifice has a diameter *d*, and said annular chamber upstream of and communicating with said nozzle orifice has a diameter D greater than *d*, and said orifice has a predetermined axial length forming a collar, whereby said collar acts as a ring-electrode having an inner circumferential surface from which said plasma arc emanates, and which prevents the plasma arc from climbing axially inward of the nozzle beyond said collar.

4,016,398

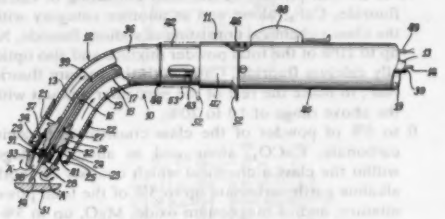
FUME EXTRACTION CONTROL FOR WELDING GUN

George R. Herrick, Mazon, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 412,453, Nov. 2, 1974, abandoned. This application May 1, 1975, Ser. No. 573,653

Int. Cl.² B23K *9/00*

U.S. Cl. 219—130 **3 Claims**



1. An arc welding gun fume extraction control for regulating the degree of fume intake at a workpiece arc welding zone in response to working conditions thereat, and for cooling a handle portion of the arc welding gun, comprising:

a fume intake port at a welding end of said welding gun:

a fume exhaust port at a handle end of said welding gun;

a tubular conduit through a single passageway in which both a weld wire and a shielding gas are fed from the handle end of said welding gun to said arc welding zone;

a tubular casing having a head portion disposed towards the welding end of said welding gun and a handle portion disposed away from the welding end of said welding gun, said casing being substantially concentrically encirclingly disposed in spaced apart relation with respect to said conduit and forming an elongated annular fume extraction passage between said conduit and said casing leading from said fume intake port to said fume exhause port, said tubular casing having an air inlet opening radially therethrough in a forward portion of said handle portion; and

an axially displaceable first sleeve circumscribingly mounted on said handle portion of said tubular casing and disposed about said air inlet opening whereby said air inlet opening may be adjusted to admit varying amounts of ambient air into said fume extraction passage by manually variably displacing said first sleeve with respect to said air inlet opening to thereby coordinatedly vary the degree of fume intake at said fume intake port and the amount of air intake at said air inlet opening to adjust the cooling effect of said air on said handle portion of said tubular casing.

4,016,399

FLUX-CORED WIRE FOR ELECTRIC ARC WELDING OF SOFT STEELS OR LOW-ALLOYED STEELS

Robert De Haeck, St. Pieters-Kapelle, Belgium, assignor to La Soudure Electrique Autogene, Procedes Arcos, Anderlecht, Belgium

Filed June 17, 1975, Ser. No. 587,554

Claims priority, application Belgium, June 17, 1974, 145490

Int. Cl.² B23K *35/22*

U.S. Cl. 219—146 **10 Claims**

1. Flux-cored wire for automatic or semi-automatic electric arc welding of low-carbon or low-alloy steel as obtained by

using the following manufacturing process comprising the following successive steps:

1. Preparing a powder mixture of a composition falling within the following weight limits:
   46 to 84% of powder of the class consisting of iron and iron having up through 10% of the weight of the total powder mixture of alloy;
   4 to 8% of refined ferromanganese having from 80 through 85% of its composition manganese;
   2 to 8% of powder of the class consisting of ferrosilicon, alone, having 45% silicon, and as another category within the class a chemical consisting of calcium silicon, CaSi, up to 7% of the total powder mixture and also optionally ferrosilicon, FeSi, with the calcium silicon, CaSi, to make the rest of the particular amount within the above range of 2 to 8%;
   10 to 20% of powder of the class consisting of calcium fluoride, CaF_2, alone and as another category within the class a chemical consisting of sodium fluoride, NaF up to 10% of the total powder mixture and also optionally calcium fluoride, CaF_2, with the sodium fluoride, NaF, to make the rest of the particular amount within the above range of 10 to 20%;
   0 to 6% of powder of the class consisting of calcium carbonate, $CaCO_3$, alone and as another category within the class a chemical which consists of another alkaline earth carbonate up to 5% of the total powder mixture, and/or magnesium oxide, MgO, up to 5% of the total powder mixture and also optionally calcium carbonate, $CaCO_3$, with the other alkaline earth carbonate and/or the magnesium oxide, MgO, to make the rest of the particular amount within the above range of 0 to 6%;
   0 to 2% of powder of the class consisting of SiO_2, Al_2O_3, potassium feldspar and mixtures of SiO_2 and one of the other two;
   0 to 2% of potassium titanate;
2. Mixing the foregoing mixture into a 30° Be solution of soluble silicate at the rate of 4 to 12 grams of solution for 100 grams of the foregoing mixture;
3. Baking the resultant product of 600° C for from 105 through 150 minutes;
4. Introducing the resultant product within a sheath of low-carbon (from 0.03% carbon through 0.09% carbon) or low-alloy (from 0.1% of alloying metal through 10% alloying metal) steel, in the proportion of from 30 through 60 grams of the product for each 100 grams of the sheath.

4,016,400

OVERHEATING SAFETY DEVICE FOR ELECTRICAL LIGHTERS

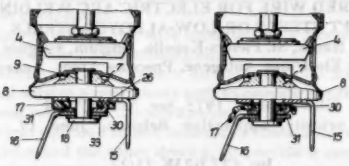
Georg Seibel, Dreiechenhain, and Günther Ante, Frankfurt am Main, both of Germany, assignors to Schoeller & Co. Elektrotechnische Fabrik, both of Frankfurt, Germany

Filed Mar. 18, 1975, Ser. No. 559,521

Claims priority, application Germany, May 20, 1974, 2424885

Int. Cl.² H05B *1/02*; H01H *37/76*; F23Q *7/24*

U.S. Cl. 219—264 **13 Claims**



1. In an electrical cigar and cigarette lighter such as used in motor vehicles of the type having a glow heating element, an electrical power supply circuit for supplying heating current to said glow element and a circuit breaking element for limiting current through said electrical supply circuit, said lighter being subject to overheating, the improvement comprising:
   a safety device for preventing deleterious overheating, said device providing a short circuit in said power supply circuit in response to excessive temperature of said lighter so as to cause said circuit breaking element to operate to deenergize said power supply circuit, and including
   an electrical socket for said lighter;
   first and second electrical contacts on said socket and connected in said power supply circuit for supplying current to said electrical socket;
   electrical insulating means, being disposed between a portion of said first contact and a portion of said second contact, said insulating means being in heat exchange relationship with said socket and being composed of a material which has a softening point above the operating temperature of the lighter in normal operation but below the temperature at which thermal damage may occur in the vicinity of the lighter when overheating results;
   and spring biasing means for urging an element electrically connected with said first contact against said insulating means, said insulating means holding said element electrically connected to the first contact out of electrical engagement with the second contact until the softening of said insulating material of said insulating means occurs upon overheating of the lighter, the softening of the insulating material allowing the element electrically connected to the first contact means to be biased by the spring biasing means into electrical engagement with the second contact to establish a short circuit between the first and second contacts to operate the circuit breaking element.

4,016,401

SWITCHING DEVICE, IN PARTICULAR FOR A PRINTED CIRCUIT

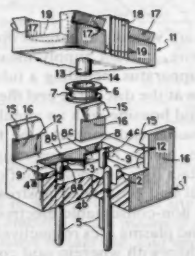
Jacques Jean Delaage, Paris, France, assignor to Societe d'Etudes et de Construction de Materiel Electronique S.E.C.M.E., Paris, France

Filed Dec. 23, 1975, Ser. No. 643,798

Claims priority, application France, Dec. 30, 1974, 74.43292

Int. Cl.² H01H *1/06*

U.S. Cl. 200—277 **7 Claims**



1. A switching device comprising a housing having a bottom, at least two electrically conductive studs projecting from the bottom of the housing and connected to connection members outside the housing, an annular contact means having an outside diameter exceeding the distance between said studs and movable in a path between two positions, as elastically yieldable positioning element cooperative with the contact means for maintaining the contact means in each of said positions and defining in said path a position through which a state of unstable equilibrium is passed through by the contact

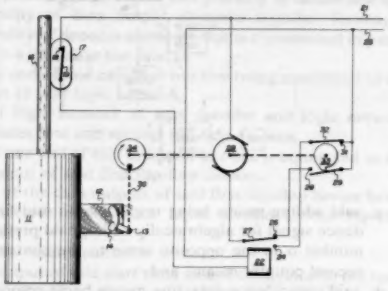
means, at least one of the two positions of said contact means corresponding to the establishment of an electric circuit between said studs, actuating means combined with said contact means for bringing the contact means to a selected one of said two positions, said contact means comprising a roller having a centre aperture and a peripheral groove in which groove there is engaged the elastically yieldable element, the roller being placed flat on the bottom of the housing, the actuating means constituting a cover for the housing which cover is slidable relative to the housing and has a face confronting the bottom of the housing and a driving journal extending from said face and engaged with clearance in a centre aperture in the roller.

4,016,402

WATER HEATER CONTROL SYSTEM

Kenneth W. Scott, 601 Ninth St., Coronado, Calif. 92118

Filed Aug. 27, 1975, Ser. No. 608,092
Int. Cl.² F24H *1/00*
U.S. Cl. 219—334 **4 Claims**



1. A water heater control system comprising:
a water heater having a thermostat control thereon and an outflow line;
temperature sensing means disposed in operable proximity to said outflow line and responsive to the temperature of water in said outflow line;
thermostat setting means electrically coupled to said temperature sensing means and mechanically coupled to said thermostat control, said thermostat setting means operable for setting said thermostat control to a high temperature position when the temperature of said water in said output line reaches a predetermined low and operable for setting said thermostat to a predetermined low temperature position when said temperature of said water in said outflow line reaches a predetermined high.

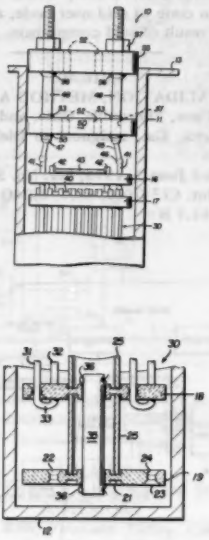
4,016,403

ELECTRICAL HEATING ELEMENT

Lorne A. Best, West Bloomfield, Mich., assignor to National Element Inc., Troy, Mich.

Continuation of Ser. No. 573,739, May 1, 1975. This application Aug. 24, 1976, Ser. No. 717,729
Int. Cl.² H05B *3/02*
U.S. Cl. 219—550 **20 Claims**

1. In a high temperature closed radiant tube furnace, the improvement of an electrical heating element positioned in said closed radiant tube, said radiant tube operable at temperatures in excess of 1500° F. comprising:
a support structure having (a) a plurality of thin, flat, non-conductive plates, each plate having a plurality of spaced apertures therethrough parallel to the axis of the plate, and (b) a plurality of non-conductive spacers of a size smaller than said plates, one of said spacers being positioned between each pair of adjacent plates, and
an electrical heating assembly having a plurality of elongated rigid electrical conductors, each extending through at least one aperture in each plate radially outwardly of said spacers, each conductor being straight between adjacent plates, each of said conductors being supported by and extending between said plates; said straight rigid conductors being free of contact with said radiant tube;



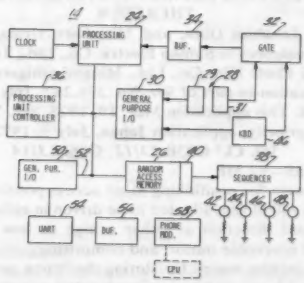
the ends of the conductors being interconnected so that the interconnected conductors define a single tortuous electrical path radially outwardly of said spacers; the conductors as interconnected maintaining said support structure in assembly.

4,016,404

CREDIT CARD VERIFIER

Frank Appleton, 1230 Niagara St., Flint, Mich. 48803

Filed Aug. 5, 1975, Ser. No. 602,105
Int. Cl.² G06K *7/00, 7/08*
U.S. Cl. 235—61.7 B **9 Claims**



1. In combination,
a carrier having binary information encoded in an information area matrix on said carrier, said information matrix including at least a scrambler code in a predetermined bit position and sequence in said information matrix, and a user code wherein the bit position and sequence of the user code within the information area matrix is dependent upon the numerical valve of the scrambler code, and
a verifier, said verifier comprising means for reading said information from said information area matrix, means for

storing said information, means for determining the numerical value of said scrambler code, and means for determining the matrix bit position and sequence of said user code as a function of the numerical value of said scrambler code, means for manually entering a comparison code into said verifier, means for comparing said comparison code to said user code, and means for indicating the result of said comparison.

4,016,405

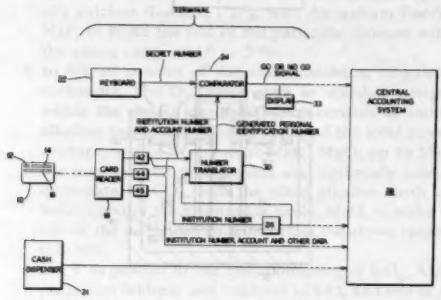
CARD VALIDATION, METHOD AND SYSTEM

Harold K. McCune, Thornville, Ohio, and Michael R. Kronewitter, Marietta, Ga., assignors to Diebold, Incorporated, Canton, Ohio

Filed June 9, 1975, Ser. No. 585,401

Int. Cl.² G06K *7/01*; H04Q *5/02*

U.S. Cl. 235—61.7 B **41 Claims**



1. Apparatus for generating a signal representing a pseudo-random number in response to first and second input signals respectively representing known numbers comprising: an addressable memory means, means responsive to said first input signal for addressing a memory location of said memory means and causing said memory means to generate a first output signal, and means for logically combining said first output signal and said second input signal for deriving another signal for addressing said memory means and causing said memory means to generate the signal representing the pseudo-random number.

4,016,406

AUTOMATIC FILM RETRIEVAL SYSTEM AND METHOD THEREFOR

Eiji Abe; Takahisa Ohta, and Mitsuharu Urata, all of Ise, Japan, assignors to Shinko Electric Co., Ltd., Tokyo, Japan and Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation-in-part of Ser. No. 376,267, July 3, 1973, abandoned. This application Mar. 19, 1975, Ser. No. 560,000

Claims priority, application Japan, July 3, 1972, 47-66464

Int. Cl.² G03B *23/12*; G06M *3/14*

U.S. Cl. 235—92 MP **3 Claims**

1. A system for positioning at an access position a desired frame of a roll of film adapted to be driven in either a forward or backward direction at either a high or low speed by a two-speed reversible motor, and comprising:

a. first counter means for storing the frame number of the desired frame to be positioned at the access position;

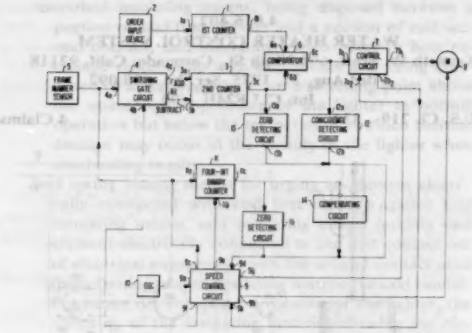
b. second counter means for counting and storing the number of the actual frame present at said access position;

c. comparator means coupled to said first and second counter means for producing a comparator output signal representative of the relative values of the numbers stored in said first and second counter means;

d. compensating circuit means for storing a predetermined number α corresponding to the number of frames to be driven at the low speed prior to the arrival of said desired frame at said access position;

e. means responsive to said comparator output signal and coupled to said compensating circuit means for, prior to movement of the film, algebraically adding to the count of said second counter means said predetermined number in a first sense depending upon the relative magnitudes of the counts stored in said first and second counter means;

f. coincidence-detecting means responsive to a first comparator output signal representative of an equality of counts in said first and second counter means, as the film is driven at a high speed by the motor, for producing a first coincidence signal for changing the speed of said motor and said film from the high speed to the low speed;



g. said adding means being responsive to said first coincidence signal for algebraically adding said predetermined number α in the opposite sense to the contents of said second counter means; and

h. said coincidence-detecting means being responsive to a subsequent comparator output signal representative of an equality of counts in said first and second counter means for stopping said motor and film, whereby said desired frame is driven toward said access position at the high speed until said predetermined number of frames before said access position, and whereby said desired frame is driven to said access position at said low speed for said predetermined number of frames.

4,016,407

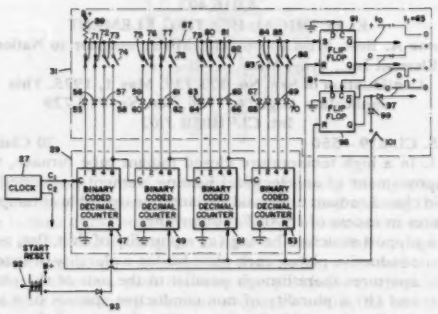
UNIVERSAL MODULAR CONTROLLER

Roderick S. Mesecar, and Frank G. Evans, both of Corvallis, Oreg., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 19, 1975, Ser. No. 614,996

Int. Cl.² G06M *3/00*

U.S. Cl. 235—92 CT **3 Claims**



1. A controller device comprising:

a. a clock device:

b. a counter device having a clock input and a data output;

c. the output of said clock device connected to the clock input of said counter device;
d. at least one decoder and logic network including a decoder and a logic network;
e. the data output of said counter device connected to said decoder of said decoder and logic network;
f. said decoder including decoding means for preselecting a coding to be decoded;
g. the output of said decoder connected to the input of said logic network of said decoder and logic network;
h. the output of said logic network providing at least one control signal when the data output of said counter device corresponds with the preselected coding of said decoder of said decoder and logic network;
i. said decoder comprising a plurality of diodes and a plurality of switches;
j. said data output of said counter device comprising a plurality of data output elements;
k. a decoder element comprising a switch, a diode and a data output element being connected in series;
l. said plurality of switches, said plurality of diodes and said plurality of data output elements together forming a plurality of decoder elements that are connected in parallel to a common bus line;
m. one end of said common bus line being connected to the input of said logic network;
n. said logic network of said decoder and logic network includes first and second flip-flop devices;
o. said one end of said common bus line is connected to the set input of said first flip-flop device;
p. one of the data outputs of said first flip-flop device being connected to the clock input of said second flip-flop device;
q. a start reset means;
r. the output of said start reset means connected to the reset input of said counter and to the reset input of said first flip-flop device; and
s. whereby, when said logic network provides said at least one control signal said first flip-flop device simultaneously provides a leading edge ongoing signal at one of the data outputs and a trailing edge offgoing signal at the other data output and said second flip-flop device simultaneously provides positive and negative going pulses at its data outputs simultaneously with and in response to the leading edge of said ongoing signal of said first flip-flop device.

4,016,408

METHOD AND ARRANGEMENT FOR SUPERVISING POWER SUPPLY SYSTEMS

Gunther W. Koetzle, Ostfildern, Germany, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,253

Claims priority, application Germany, Dec. 12, 1974, 2458736

Int. Cl.[2] G06F *11/00*

U.S. Cl. 235—153 A **16 Claims**

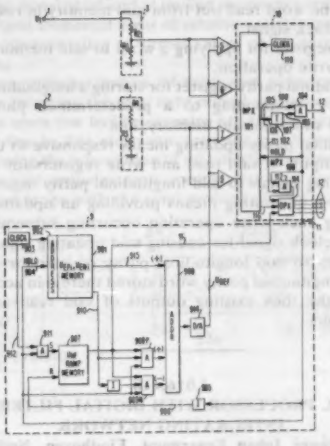
1. A method of supervising power supply systems supplying a plurality of supply voltages with different desired values and different acceptable extreme tolerance values, characterized in that

all actual values of the supply voltages are normalized by respective scale factors to a uniform nominal value,

that in a repeated tolerance checking cycle a variable reference value is generated which step by step passes through all acceptable extreme values, said extreme values being referred to nominal value, that

the normalized supply voltages is compared with their associated extreme values and

a respective output signal is emitted each time the normal-



ized actual value deviates from said nominal value by more than its associated acceptable extreme value.

4,016,409

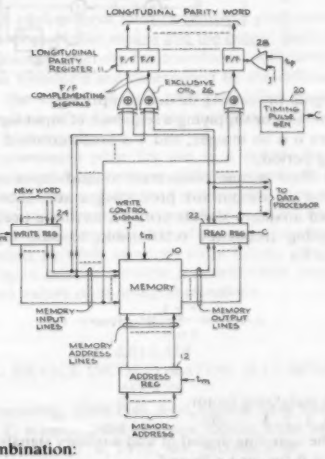
LONGITUDINAL PARITY GENERATOR FOR USE WITH A MEMORY

Dongsung Robert Kim, Fountain Valley, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Mar. 1, 1976, Ser. No. 662,573

Int. Cl.[2] G06F *11/10*; G11C *29/00*

U.S. Cl. 235—153 AM **5 Claims**



1. In combination:

a digital memory for storing a plurality of words at selectably addressable locations thereof;

addressing means for addressing a selected word address in said memory;

said memory being responsive to said addressing means for performing a read operation during which a word is read out from said selected word address followed by a write operation during which a word applied to said memory is stored in said selected word address;

pulse generating means for generating a clock signal occurring following each read out of a word from said memory and prior to completion of said write operation;

a read register to which a word read out from said memory is applied, said read register being set up in accordance with the word read out from said memory in response to said clock signal;

a write register for applying a word to said memory during said write operation;

a longitudinal parity register for storing a longitudinal parity word corresponding to a predetermined plurality of words stored in said memory; and

longitudinal parity updating means responsive to the existing outputs of said read and write registers for applying updating signals to said longitudinal parity register;

said pulse generating means providing an updating signal during each write operation occurring subsequently to each clock signal for causing said updating signals to be applied to said longitudinal parity register for updating the longitudinal parity word stored therein in accordance with the then existing outputs of said read and write registers.

4,016,410

SIGNAL PROCESSOR WITH DIGITAL FILTER AND INTEGRATING NETWORK

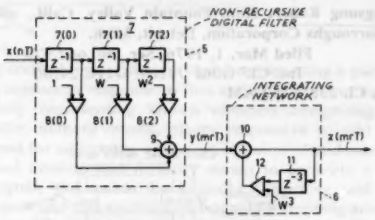
Ludwig Désiré Johan Eggermont, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 20, 1975, Ser. No. 633,578

Claims priority, application Netherlands, Dec. 18, 1974, 7416480

Int. Cl.² G06F *7/38, 15/34*

U.S. Cl. 235—156 **5 Claims**



1. A signal processing device comprising

input means for supplying a sequence of input signals $x(n\mathrm{T})$, where n is an integer, and T a predetermined input sampling period;

digital filter means connected to said input means, and having an output for producing a sequence of binary coded auxiliary signals $y(mr\mathrm{T})$, having a predetermined sampling frequency relationship to said input signals given by

$$y(mr\mathrm{T}) = \sum_{i=0}^{r-1} W^i \, x\,[(mr-1)T]$$

wherein

W is a weighting factor;

$m = 0, 1, 2, 3 \ldots$ etc.;

$r\mathrm{T}$ is the sampling period of said auxiliary signals; and $x(mr\text{-}i)\mathrm{T} = 0$ for mr-i < 0; and

an integrating network having an input connected to said output of said digital filter means, and an output for generating signal samples $z(mr\mathrm{T})$ related to said auxiliary signal samples by

$$z(mr\mathrm{T}) = \sum_{j=0}^{m} W^{m-jr}\, y(jr\mathrm{T}) = W^r z\,[(m-1)r\mathrm{T}] + y(mr\mathrm{T})$$

where

$z\,[(m\text{-}1)r\mathrm{T}] = 0$ for all $m\text{-}1 < 0$.

4,016,411

MINI ELECTRONIC CALCULATOR WITH BLACKBOARD DISPLAY FORMAT

Robert Genin, Bay Harbor Islands, Fla., assignor to Jardine Industries, Inc., Hong Kong, Hong Kong

Filed Jan. 29, 1976, Ser. No. 653,606

Int. Cl.² G09B *19/02;* **G06F** *15/02*

U.S. Cl. 235—156 **8 Claims**

1. A mini electronic calculator for adding or subtracting two complete numbers comprising:

A. an integrated circuit arithmetic unit having means to carry out addition and subtraction of two complete numbers entered therein;

B. a keyboard associated with the input of the unit, said keyboard having three parallel sets of keys arranged along horizontal lines, the keys of the first set being constituted by a row of digit keys marked with the digits 0 to 9 for entering the first complete number, the keys of the second set being constituted by a corresponding row of digit keys for entering the second complete number, and the keys of the third set including a plus function key, a minus function key, an equal sign key and an erase key, said erase key being coupled to the unit to clear the display in preparation for a fresh computation; and

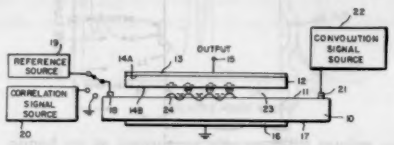
C. an electro-optic display associated with the output of the unit, said display having three parallel groups of stations arranged along horizontal lines, the stations in the first group being digit stations for presenting the first complete number entered by successive actuation of keys in the first set, the stations in the second group being constituted by a lead station for presenting the function entered by actuating the plus or minus key, followed by digit stations for presenting the second complete number entered by successive actuation of keys in the second set, the third group being constituted by digit stations for presenting the result, whereby the display exhibits the first and second complete numbers and the result of a computation in a blackboard format, said first and second display groups each having three digit stations at corresponding locations to limit the complete numbers to three digits, the third group having four digit stations to provide the result, said arithmetic unit including means to disregard entries after three digits have been successively entered in the first group of digit stations and to disregard entries after three digits have been successively entered in the second group of digit stations.

4,016,412

SURFACE WAVE DEVICES FOR PROCESSING SIGNALS

Ernest Stern, Concord, and Richard C. Williamson, Framingham, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Mar. 5, 1975, Ser. No. 555,367
Int. Cl.² G06G 7/19; H04R 17/00
U.S. Cl. 235—181 20 Claims



1. A device for processing and storing signals comprising

a first piezoelectric substrate capable of propagating acoustic wave signals on a selected surface thereof;

at least one transducer means formed on said selected surface for generating surface acoustic waves traveling on said surface along a selected direction thereof in response to electrical signals;

a semiconductor material positioned so as to have a first surface thereof adjacent and spaced from said selected surface of said first substrate to form an interaction region which includes the region at or near said surfaces and the spatial region therebetween;

at least one of said piezoelectric substrate surface regions and said semiconductor material surface region being capable of operating as a storage element for electrons or carriers;

a layer of conductive material disposed on a second surface of said semiconductor material, said layer forming an electrode;

means for providing a first signal at said at least one transducer means to produce a first traveling acoustic wave signal along said selected surface of said first substrate;

a source of electrons or carriers;

means for applying a time-varying second signal uniformly over said interaction region when said first signal is positioned on the surface of said piezoelectric substrate at said interaction region to provide time-varying properties thereof, the interaction of said first and second signals thereby causing electrons or carriers to migrate from said source into said at least one of said storage elements in accordance with said interaction to provide an altered stationary conductivity pattern in said semiconductor material, which altered conductivity pattern remains stored in said semiconductor material for a selected time period and represents said interacted first and second signals.

4,016,413

OPTOELECTRONIC MEANS FOR ONE-DIMENSIONAL INTEGRAL TRANSFORMS OF TWO DIMENSIONAL INFORMATION

Jenny Bramley, Falls Church, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation of Ser. No. 456,394, March 29, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,784
Int. Cl.² G06G 9/00; G02B 5/20
U.S. Cl. 235—181 14 Claims

5. Apparatus for rapidly processing pictorial information comprising:

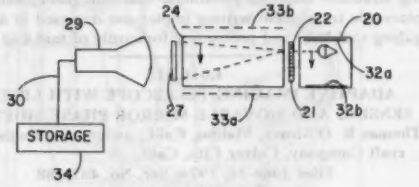
a. a source of substantially parallely arranged pictorial information illuminated one line at a time;

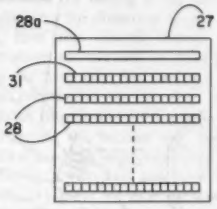
b. optoelectronic means including electronic line by line scanning means receiving light intensity output from said source of substantially parallely arranged pictorial information;

c. a light transmissive plate in contiguous relation with the output face of said optoelectronic means, said plate having parallely arranged strips, a first strip having a density of the material of said plate and succeeding strips having adjacent elemental areas of relative variable transmittivities corresponding to kernel values of an integral transform;

d. photomultiplier means adjacent said light transmissive plate receiving the total light output of said transmissive plate upon line by line scanning of said information; and

e. said line by line electronic scanning means successively sweeping the information of said illuminated line received from said optoelectronic means over said parallely arranged strips with the total amount of light transmitted





through each strip of said transmissive plate received by said photomultiplier means and the output thereof stored electronically whereby the transform coefficients of said integral transform are determined by the difference between the output of said photomultiplier means after illumination of a line of said transmissive plate and a stored bias signal.

14. A transmissive plate for use in a system for rapidly processing pictorial information utilizing transform coefficients of an integral transform, said transmissive plate comprising a plurality of horizontally disposed strips, a first one of said plurality of strips having a density of the material of said plate and succeeding parallely arranged strips having adjacent elemental areas of relative variable transmittivities corresponding to kernel values of an integral transform.

4,016,414

WRITING DEVICE INCORPORATING ILLUMINATING MEANS

Scott M. Browning, 3269 Polk Ave., Ogden, Utah 84403, and Gregory F. Klomp, 2500 Fillmore, Ogden, Utah 84401

Filed Apr. 9, 1975, Ser. No. 566,370
Int. Cl.² F21V 33/00; B43K 29/10
U.S. Cl. 240—6.46 7 Claims

1. A writing device with self-contained lighting means and

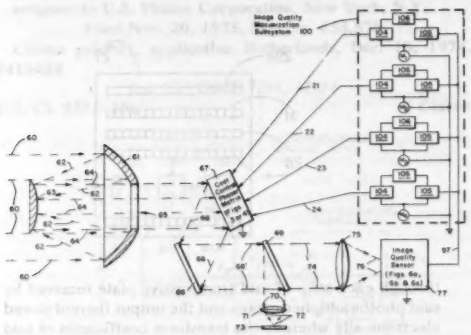
including, in combination: a casing having a rearward extremity, an elongate translucent end piece secured to and within said casing and having an axial bore and a light-means-receiving and positioning socket contiguous with and rearwardly disposed with respect to said bore; light means positioned within and engaging said socket for transmitting light energy forwardly through said translucent end piece; battery means disposed in said casing and operatively engaging said light means; a closure secured to said casing at said rearward extremity; a compression spring operatively interposed between said closure and said battery means; circuit means coupled to said battery means and light means for selectively supplying electrical energy from said battery means to said light means, said circuit means including manual pressure-actuated switching structure disposed proximate said end piece; and a replaceable translucent writing implement disposed in and engaging said bore and protruding forwardly of said end piece.

4,016,415

ADAPTIVE IMAGING TELESCOPE WITH LINEAR SENSING AND MOVABLE MIRROR PHASE SHIFTING

Thomas R. O'Meara, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed June 24, 1974, Ser. No. 482,188
Int. Cl.² G01J *1/20*
U.S. Cl. 250—201 **21 Claims**



1. An adaptive imaging telescope for detecting an optical image received thereby at the telescope aperture which image is communicated by an optical beam comprising in combination:

a movable mirror phase shifter, positioned at image plane of the telescope aperture, responsive to the optical beam, said phase shifter including a plurality of piezoelectric crystals spaced apart from each other a predetermined distance, each of the crystals have a bore therein, a first metallic film on the surface of the bore and a second metallic film on the outer surface of the crystal circumjacent the first metallic film;

first means optically coupled to the phase shifter, for converting said optical beam into an electrical signal which is linear in magnitude with respect to the magnitude of the electrical signal; and

second means, electrically coupling the first means and the phase shifter, for providing phase modulation of the optical beam.

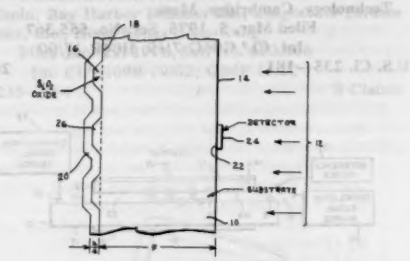
4,016,416

PHASE COMPENSATED ZONE PLATE PHOTODETECTOR

Freeman D. Shepherd, Jr., Chelmsford, and Sven A. Roosild, Framingham, both of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 23, 1976, Ser. No. 669,584
Int. Cl.² H01J *39/12*
U.S. Cl. 250—211 J **7 Claims**

1. A phase compensated zone plate photodetector comprising: a base of material transparent to radiation; a plurality of coincentric rings, transparent to radiation mounted on one face of said base; a radiation reflective material overcovering



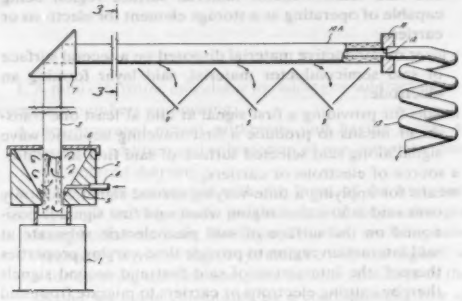
the said face of the base and rings mounted thereon, and radiation detection means for receiving reflected radiation mounted on a second face of said base.

4,016,417

LASER BEAM TRANSPORT, AND METHOD

Richard Glasscock Benton, 1300 St. Joseph Prof. Bldg., Houston, Tex. 77002

Filed Jan. 8, 1976, Ser. No. 647,609
Int. Cl.² G01N *27/28*; H01S *1/00*, *9/00*; F04B *21/00*
U.S. Cl. 250—251 **6 Claims**



1. In a laser transport, a laser beam generator, a tubular laser beam generated thereby, means for introduction of a vapor into said beam, conveyor joints for directional control of the longitudinal movement of said beam, passageways through said conveyor joint for the passage of said vapors with the projection of said beam.

4,016,418

METHOD OF RADIOACTIVITY ANALYSIS

Donald L. Horrocks, Placentia, and Paul R. Klein, Laguna Niguel, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Feb. 12, 1976, Ser. No. 657,523
Int. Cl.² G01D *8/00*
U.S. Cl. 250—252 **20 Claims**

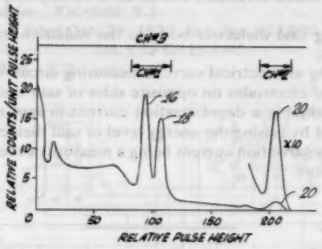
1. A method of determining the radioactive source strength of a sample of a radionuclide which emits two quanta of radiation in coincidence or near coincidence, said method comprising the steps of:

measuring only in a first counting channel of a detection instrument the radiation due to single quanta;

measuring only in a second counting channel of the detection instrument the radiation due to coincident pairs of quanta; and

computing the source strength of the sample from the results of said measuring steps;

whereby the source strength may be conveniently deter-



mined on an instrument also used for routine radiation measurements.

4,016,419

NON-DISPERSIVE X-RAY FLUORESCENCE ANALYZER

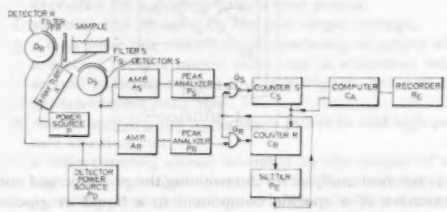
Haruo Kotani, Osaka; Haruyoshi Hirata, and Yoshinori Hosokawa, both of Kyoto, all of Japan, assignors to Horiba, Ltd., Kyoto, Japan

Filed Aug. 26, 1975, Ser. No. 607,903

Claims priority, application Japan, Sept. 30, 1974, 49-113115

Int. Cl.² G01N *25/00*

U.S. Cl. 250—272 **3 Claims**



1. A non-dispersive fluorescence X-ray analyzer for measuring the concentration of an element contained in a sample, comprising an X-ray source including a power source, means for holding a sample to be analyzed and a reference sample in the path of the X-rays from said X-ray source, detecting means for each of said samples for detecting the fluorescence X-ray spectrum of the said element for which the analysis is being made from among the fluorescence X-ray spectra radiated from each sample and converting it to a series of pulse signals for each sample, a counting means connected to each detection means for counting the pulse signals from each sample, and means coupled between the respective counting means for stopping the supply of pulse signals to the counting means for the sample detecting means when the pulses counted by the counting means for the reference sample becomes equal to a predetermined number, whereby the number of pulses counted for the sample to be analyzed can be used for performing a mathematical computation to determine the concentration of the element for which the sample is being analyzed and whereby drifts of the intensity of the output of the X-ray source and drifts due to temperature changes, for example, are automatically compensated for.

4,016,420

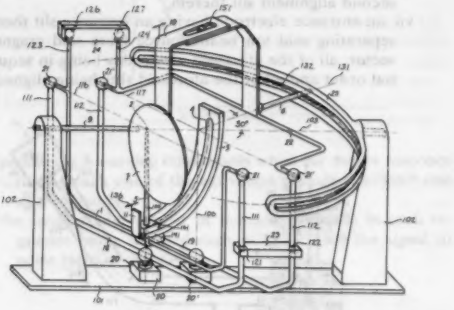
PRECESSION-TYPE X-RAY DIFFRACTION CAMERA

Milan Rieder, Prague, Czechoslovakia, assignor to Dekanat Prirodovedecke Fakulty University Karlovy, Prague, Czechoslovakia

Filed May 30, 1975, Ser. No. 582,343

Int. Cl.² G01M *23/20*

U.S. Cl. 250—277 CH **9 Claims**



1. In a precession camera for taking X-ray diffraction pictures of a crystal, a collimator for directing X-rays along a first fixed horizontal axis, first and second frames individually supported for rotation about second and third ganged vertical axes each intersecting the first axis, first and second support members individually connected to the first and second frames for rotation about fourth and fifth ganged horizontal axes individually intersecting the second and third axes and each intersecting the first axis, the interconnected frames and support members defining a two-axis sub-system, a crystal holder for supporting the crystal at the intersection of the first, third and fifth axes, an elongated element coupled to the first support member and extending perpendicular to the fourth axis to define a sixth axis, a first planar film holder supported along the first axis in the path of the X-rays and disposed perpendicular to the sixth axis, the collimator extending through the plane of the film holder, means including the element for precessing the sub-system about the first axis at a selectable angle determined by the deviation of the sixth axis from the first axis, a first circular segment connected to the second support member and having a first 90° circumferential groove therein, the first segment being oriented in a plane perpendicular to the second support member and parallel to the sixth axis, and means supporting the crystal holder for circumferential movement in the first groove.

4,016,421

ANALYTICAL APPARATUS WITH VARIABLE ENERGY ION BEAM SOURCE

Charles W. Hull, Sierra Madre; T. Wilson Whitehead, Monrovia, and Bruce N. Colby, Glendora, all of Calif., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 13, 1975, Ser. No. 549,505

Int. Cl.² B01D *59/44*; H01J *27/00*

U.S. Cl. 250—281 **26 Claims**

13. An analytical apparatus comprising:

a. a gas chromatograph comprising a gas chromatographic column with a gas inlet and a gas outlet;

b. a mass spectrometer comprising a variable energy ion beam source, a magnetic sector for deflecting the ions in the ion beam according to their momentum and detector means for detecting those ions within the ion beam which have been deflected by a given angle by the magnetic sector, said ion beam source comprising:

i. a repeller electrode;

ii. first, low energy, alignment electrode, having a first

alignment slit therein and coacting with said repeller electrode to define an ion-forming region therebetween;

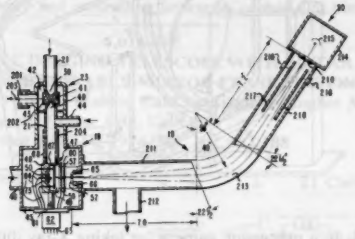
iii. inlet means for introducing gas into the ion-forming region;

iv. means for forming an electron beam in said ion-forming region;

v. an extraction electrode with an extraction slit therein;

vi. second, high energy, alignment electrode having a second alignment slit therein;

vii. an entrance electrode having an entrance slit therein separating said ion beam source from said magnetic sector, all of the aforesaid electrodes being in sequential order and all of the aforesaid slits being aligned to



define a straight path between the electron beam and the entrance slit;

viii. means for maintaining said repeller electrode at a constant potential relative to said first alignment electrode and said first alignment at a constant positive potential relative to said extraction electrode;

ix. means for maintaining said second alignment electrode at a potential more negative than and proportional to that of said extraction electrode;

x. means to maintain said extraction electrode at a positive potential relative to said entrance electrode and to vary its potential relative to said entrance electrode; and

c. an interface for connecting the gas outlet to said chromatograph to said inlet means of said ion beam source.

4,016,422

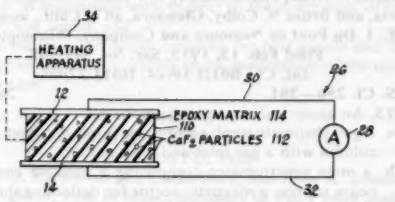
RADIATION DOSIMETRY BY MEASUREMENT OF POLARIZATION AND DEPOLARIZATION CURRENTS

Paul Richard Moran; Ervin B. Podgorsak, both of Madison, Wis., and David E. Fields, Oak Ridge, Tenn., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Continuation of Ser. No. 346,720, April 2, 1973, which is a continuation-in-part of Ser. No. 290,726, Sept. 20, 1972, abandoned. This application May 12, 1975, Ser. No. 576,272

Int. Cl.[2] G01T 1/16

U.S. Cl. 250—336 **30 Claims**



1. A method of measuring radiation,

comprising the steps of providing a dielectric body made of a dielectric material selected from a group consisting of alkaline earth fluorides, other alkaline earth halides, alkali metal fluorides, other alkali metal halides, alkaline earth oxide ceramics, and alkaline earth phosphate minerals,

exposing said dielectric body to the radiation to be measured,

providing an electrical current measuring circuit between a pair of electrodes on opposite sides of said body,

and producing a depolarization current in said measuring circuit by raising the energy level of said dielectric body,

said depolarization current being a measure of the radiation exposure.

4,016,423

INFRARED ANALYZER OF CONSTANT RADIANT ENERGY

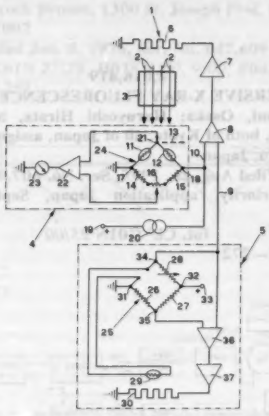
Emilio G. Meyer, Rozzano (Milan), Italy, assignor to Leeds & Northrup Italiana S.p.A., Milan, Italy

Filed Jan. 20, 1976, Ser. No. 650,748

Claims priority, application Italy, Feb. 4, 1975, 19938/75

Int. Cl.[2] G01J 1/00, 1/32; G01N 21/24, 21/26

U.S. Cl. 250—343 **3 Claims**



1. Infrared analyser for determining the presence and concentration of a specific component in a liquid or gaseous sample comprising a source of radiant energy arranged to direct an infrared radiation beam against the sample to be analysed, and a detector arranged to receive said radiation beam downstream of the sample and provide a measurement of the concentration of the component under investigation in the form of an indication of the quantity of energy of infrared frequency absorbed by the said component during passage of the radiation beam through the sample, said detector comprising two thermistors both exposed to the radiation from the sample, in the case of one of them by way of screening means arranged to produce a different ohmic response by the two thermistors when energy is absorbed by said component, said thermistors being electrically connected into a balanceable bridge circuit provided with an instrument for measuring unbalance, so that said difference in ohmic response produces an unbalance in said bridge circuit which is indicative of the quantity of energy absorbed by said component and therefore of the concentration of the component in the sample under analysis, wherein said source of radiant energy is fed by the outlet of a comparator which receives as its respective inlets a reference signal of constant value and a signal which varies as a function of the sum of the instantaneous ohmic values of the two thermistors and therefore as the total radiant energy received by the detector.

4,016,424

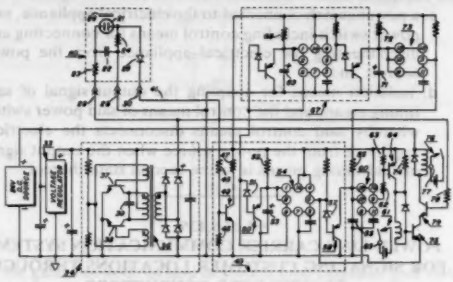
ULTRAVIOLET RADIATION DETECTOR

Richard Traina, Randolph Township, N.J., assignor to Alison Control Inc., Fairfield, N.J.

Filed Oct. 20, 1975, Ser. No. 623,809

Int. Cl.² G01J 1/42

U.S. Cl. 250—372 2 Claims



1. A UV detection system comprising,

a. a Geiger-Mueller tube having anode and cathode elements,

b. an energy-limited voltage supply circuit for said tube connected between the said elements,

c. a limited energy storage network connected across the tube elements, which network in conjunction with said energy-limited supply circuit causes the tube to develop output voltage pulses having a rate directly proportional to the magnitude of photon energy and inversely proportional to the distance of the tube from a source of UV radiations,

d. means applying the tube output pulses to a normal pulse rate alarm circuit producing an output when a first predetermined pulse rate is exceeded,

e. a duration circuit responsive to the output of said normal pulse rate alarm circuit and providing an output voltage when the said first predetermined pulse rate has been exceeded for a predetermined time period,

f. alarm means actuated by the said output voltage,

g. a high pulse rate alarm circuit producing an output when a second predetermined pulse rate is exceeded, which second pulse rate is substantially higher than said first predetermined pulse rate,

h. means applying the tube output pulses to said high pulse rate alarm circuit,

i. a differentiating circuit imitiated by the output of said high pulse rate alarm circuit, said differentiating circuit providing an output voltage only when the first derivative of the tube pulse rate is zero, and

j. means responsive to the output voltage of said differentiating circuit and inhibiting actuation of said alarm means.

4,016,425

METHODS AND APPARATUS FOR OPTIMIZING THE RESPONSE OF TRANSDUCERS

Robert L. Farquhar, Twyford, and Phillip D. Snook, Pinner, both of England, assignors to Graviner Limited, England

Filed Nov. 5, 1975, Ser. No. 629,015

Claims priority, application United Kingdom, Nov. 5, 1974, 47755/74

Int. Cl.² G01J 1/42

U.S. Cl. 250—372 18 Claims

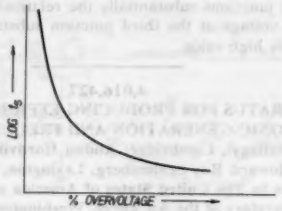
1. A method of optimising the response of a sensing device whose operation is at least in part random but has a predictable probability, comprising the steps of

defining repeated sequences of successive time instants which are fixed in time relative to a time datum,

rendering the device active at each instant of the said sequences,

holding the device active for not more than a respective activation period following each instant,

consecutive activation periods being mutually separated by recuperation time periods and all the said periods being of predetermined lengths, and



producing a warning output only when the device responds during each one of the activation periods in at least one said sequence,

the lengths and number of activation periods in each sequence being selected such as to increase the signal to noise ratio of the device.

4,016,426

AIR CUSHION ACTUATION AND MALFUNCTION DETECTION AND RECORDING CIRCUIT

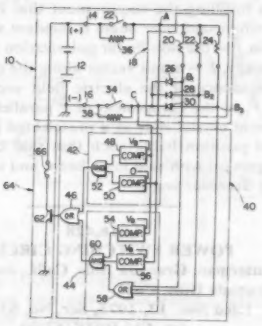
Tetsuji Nishioka, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Nov. 21, 1975, Ser. No. 634,270

Claims priority, application Japan, Nov. 29, 1974, 49-143358

Int. Cl.² B60R 21/08

U.S. Cl. 307—10 R 5 Claims



1. In a passenger conveyance provided with a safety device, electrically operated actuator means for actuating the safety device, said actuator means comprising a plurality of squibs and a plurality of diodes having their anodes connected to one sides of the squibs, respectively;

a control circuit for operating said actuator means comprising first normally open condition responsive switch means connecting the other sides of the squibs to a source of direct current; second normally open condition responsive switch means connecting cathode sides of the diodes to a reference potential and first and second resistor means connected across said first and second switch means, respectively, to normally establish a first potential at a first junction between said first switch means and said actuator means, seco. potentials at second junctions between the diodes and the squibs, respectively, and a third potential at a third junction between said actuator means and said second switch means;

recorder means; and

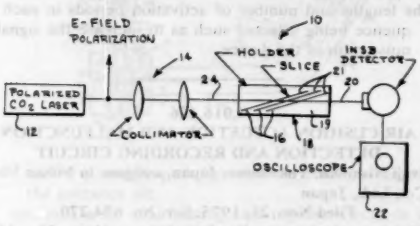
malfunction detecting means for energizing said recorder means when the voltage at the first junction assumes substantially a relatively low value and the voltage at the third junction substantially a relatively high value or when the voltage at the first junction assumes substantially the relatively high value, the voltage at least one of the second junctions substantially the relatively low value and the voltage at the third junction substantially the relatively high value.

4,016,427

APPARATUS FOR PRODUCING EFFICIENT SECOND HARMONIC GENERATION AND FREQUENCY MIXING

Andrei Szilagyi, Cambridge; Audun Hordvik, Nagog Woods, and Howard Roy Schlossberg, Lexington, all of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 21, 1976, Ser. No. 650,840
Int. Cl.² H02M *5/04*
U.S. Cl. 307—88.3 **15 Claims**



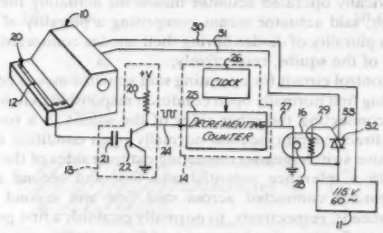
1. An apparatus for producing second harmonic generation comprising a laser source for producing a laser beam at a preselected frequency, at least one crystal slice, said crystal slice having a preselected thickness and orientation, said orientation fulfilling the requirement that $P_{11} = \vec{P} \cdot \vec{E}$ be a maximum when said laser beam is incident at Brewster angle and wherein $\vec{P}$ = the non-linear polarization at twice the incident frequency, $\vec{E}$ = a unit vector along the component in the plane of incidence of the electric field vector of said laser beam and $\vec{P}_{11}$ = the component of $\vec{P}$ parallel to $\vec{E}$, means for mounting said crystal slice in a preselected position and said preselected position being such that said crystal slice is in optical alignment with said laser beam and said laser beam is incident at Brewster angle.

4,016,428

POWER SWITCHING CIRCUIT

Eric D. Gutterman, Granada Hills, Calif., assignor to Allan S. Beck, Granada Hills, Calif.

Filed Nov. 13, 1975, Ser. No. 631,438
Int. Cl.² H03K *17/00*
U.S. Cl. 307—116 **10 Claims**



1. A power switching circuit for use with electrical appliances driveable by a power source comprising:

a. input signal means for receiving signal indicia representative of appliance operation;

b. timing means for initiating the time out of a predetermined interval, said time out commencing upon each signal indicia received by said input signal means, said timing means being coupled to said input signal means, said timing means outputting a signal responsive to said interval, said output signal being in a first state during said interval and changing to a second state following the termination of said interval;

c. a power switch connected to the electrical appliance, said power switch including control means for connecting and disconnecting the electrical appliance from the power source; and

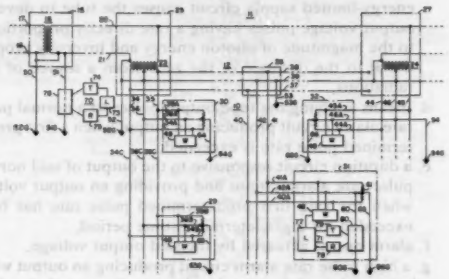
d. isolation means for coupling the output signal of said timing means and the control means of said power switch whereby said control means disconnects the electrical appliance from the power source when the output signal of said timing means is in the second state thereof.

4,016,429

POWER LINE CARRIER COMMUNICATION SYSTEM FOR SIGNALING CUSTOMER LOCATIONS THROUGH GROUND WIRE CONDUCTORS

Leonard C. Vercellotti, Verona, and Ian A. Whyte, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 16, 1976, Ser. No. 649,774
Int. Cl.² H04B *13/02*
U.S. Cl. 307—149 **9 Claims**



1. A power line communication system for conveying carrier current signals between two locations in an electrical power system including a distribution transformer, comprising:

a first ground wire which connects an uninterrupted neutral conductor of the power system directly to real earth ground at a first of the two locations;

means including a first current transformer having a single turn primary formed by said first ground wire for inducing a first current signal in said first ground wire in response to first communication signals;

a second ground wire which connects said neutral conductor of the power system directly to real earth ground at the second of the two locations; and

means including a second current transformer having a single turn primary formed by said second ground wire for detecting a second current signal in the second ground wire which is responsive to the first current signal.

4,016,430

MIS LOGICAL CIRCUIT

Tadao Kanezuka, Tokorozawa, Japan, assignor to Hitachi, Ltd., Japan

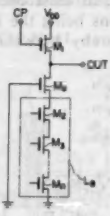
Filed Dec. 23, 1975, Ser. No. 643,772
Claims priority, application Japan, Jan. 6, 1975, 50-000105
Int. Cl.² H03K *19/08, 19/20*
U.S. Cl. 307—205 **4 Claims**

1. A logical circuit comprising:

a logic block including at least one input terminal and an

output terminal, and at least one driving insulated gate field effect transistor connected between a respective input terminal and the output terminal of said logic block; and

a depletion type insulated gate field effect transistor and a load element connected in series between a load supply voltage terminal to which a supply voltage is applied and the output of said logic block; and wherein



the gate electrode of said depletion type insulated gate field effect transistor is applied with a voltage the absolute value of which is less than the difference between the absolute value of said supply voltage and the absolute value of the threshold voltage of said depletion type insulated gate field effect transistor.

4,016,431

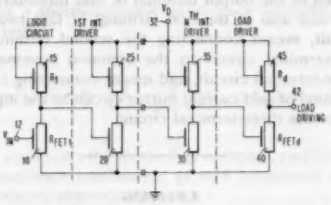
OPTIMAL DRIVER FOR LSI

Robert Athanasius Henle, Clinton Corners, and Irving Tze Ho, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,765

Int. Cl.² H03K *3/353, 5/159, 19/08*

U.S. Cl. 307—208 **2 Claims**



1. In an integrated circuit structure wherein the output of a signal driver circuit contained on a monolithic chip is connected via multiple intermediate driver stages to the input of a load driving circuit, with the output capacitance of the load driver circuit being at least one hundred times greater than the output capacitance of the signal driver;

a plurality of n intermediate driver stages which will minimize the total signal propogation delay between the signal driver and the load driver, where n is selected to be at least five and otherwise satisfies the equation $n = 1n\ M$ with M = capacitance of load driver/capacitance of signal driver.

4,016,432

VARIABLE RATE ROTARY PULSE GENERATOR

Michael S. Marzalek, Cotati, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 1, 1975, Ser. No. 618,547

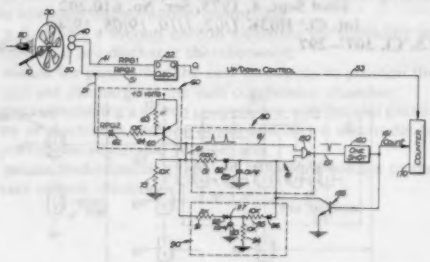
Int. Cl.² H03K *5/18*

U.S. Cl. 307—233 A **5 Claims**

1. Pulse generating apparatus comprising:

generating means having a rotating element for providing a first digital signal in response to the rotation of said rotating element at varying speeds;

speed sensing means coupled to the generating means for producing a control signal representing the rotational speed of the rotating element in response to the first digital signal; and



variable pulse dividing means coupled to generating means and the speed sensing means for producing a variable division ratio digital output signal which is a function of the varying pulse repetition rate of the first digital signal and the control signal.

4,016,433

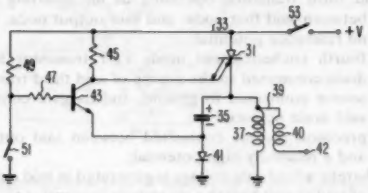
GTO CIRCUITS

Ronald Robert Brooks, Hamilton Square, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jan. 23, 1976, Ser. No. 651,798

Int. Cl.² H03K *17/72;* **F02P** *1/00*

U.S. Cl. 307—252 C **10 Claims**



1. A switching circuit comprising:

first and second terminals across which a direct operating potential may be applied;

load means;

a gate-turn-off silicon controlled rectifier having an anode electrode connected to said first terminal, a cathode electrode connected via said load means to said second terminal, and a gate electrode;

charge storage means connected at one terminal to said cathode electrode and coupled at its other terminal to said second terminal responsive to current flow through said rectifier for accumulating a charge;

means coupled to said gate electrode of said rectifier for supplying a voltage thereto during one period of time for turning said rectifier on, and for connecting said gate electrode to said other terminal of said charge storage means during a second period of time for thereby permitting said charge storage means to discharge through a conduction path between said cathode-gate electrodes, for turning said rectifier off; and

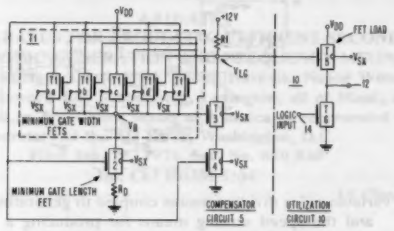
isolating means connected between the other terminal of said charge storage means and said second terminal for substantially preventing any discharge current from flowing through said load means.

4,016,434

LOAD GATE COMPENSATOR CIRCUIT

Robert Joseph DeFilippi, Reston, Va., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 4, 1975, Ser. No. 610,202
Int. Cl.² H03K *1/02, 1/10, 19/08, 19/40*
U.S. Cl. 307—297 **6 Claims**



1. In an integrated circuit on a semiconductor substrate, a load gate compensator circuit comprising:

a first enhancement mode FET transistor in said substrate having its drain connected to a drain potential, its source connected to a first node, and its gate connected to an output node, said first transistor comprising a plurality of component FET devices connected in parallel, each said component device having a gate of minimum width;

a second enhancement mode FET device in said substrate having its drain connected to said first node, its source connected through a diffused resistor to ground, and its gate connected to said drain potential;

said second FET transistor having a gate region with a minimum length;

a third enhancement mode FET transistor having its drain connected to said output node, and its gate connected to said first node;

said third transistor operating as an inverting amplifier between said first node, and said output node, requiring no reference potential;

a fourth enchancement mode FET transistor having its drain connected to the source of said third transistor, its source connected to ground, and its gate connected to said drain potential;

a precision resistor connected between said output node and a relatively high potential;

whereby a load gate voltage is generated at said output node of said circuit having a magnitude responsive to variations in the processing parameters of said integrated circuit.

4,016,435

CURRENT STABILIZING ARRANGEMENT

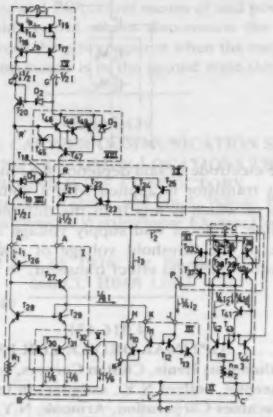
Johannes Otto Voorman, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 26, 1975, Ser. No. 553,279
Claims priority, application Netherlands, Mar. 11, 1974, 7403202
Int. Cl.² H03K *17/00*
U.S. Cl. 307—296 R **10 Claims**

1. A current stabilizing arrangement comprising:

a. a three-terminal circuit comprising an input terminal, an output terminal, a common terminal and two parallel branches connected between the input terminal and the common terminal, one branch including the collector-emitter path of a first transistor and the other branch at least the base-emitter junction of a second transistor in series with a resistor, the collector of the second transistor being connected to said output terminal of the three-terminal network and the base of the first transistor being driven by a signal derived from the input signal in such a way that for a constant current at the input terminal a current with a negative temperature coefficient appears at the output terminal,

b. a two-terminal circuit comprising first and second terminals and two parallel branches connected there between and which are coupled by means of a current dividing circuit so that the currents which flow through the two branches bear a fixed ratio to each other, at least one semiconductor junction included in the one branch and by-passed by a series connection of at least one semiconductor junction and a resistor which is included in the other branch, at least one of the two said semiconductor junctions being the base-emitter junction of a transistor, whereby between the first and second



terminals of said two-terminal circuit a current with a positive temperature coefficient appears, and

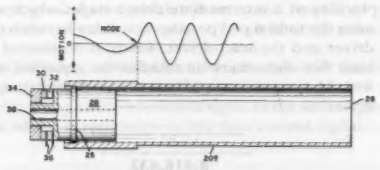
c. a current mirror circuit having an input terminal connected to the output terminal of said three-terminal circuit and also to the first terminal of said two-terminal circuit, means connecting the second terminal of the two-terminal circuit to the common terminal of said three-terminal circuit, and means connecting the output terminal of said current mirror circuit to the input terminal of the three-terminal circuit.

4,016,436

SONIC OR ULTRASONIC PROCESSING APPARATUS

Andrew Shoh, Ridgefield, Conn., assignor to Branson Ultrasonics Corporation, New Canaan, Conn.

Filed Dec. 10, 1975, Ser. No. 639,219
Int. Cl.² H01L *41/04*
U.S. Cl. 310—8.2 **12 Claims**



1. A sonic processing apparatus comprising:

a first resonator dimensioned to be resonant in a direction along its longitudinal axis when energized with high frequency vibratory energy, and

a second resonator coaxially coupled to said first resonator substantially at a nodal region of axial vibratory motion of said first resonator for receiving said vibratory energy and being dimensioned for transmitting the energy as radial flexural waves longitudinally along the wall of said second resonator.

4,016,437
PIEZOELECTRIC PRESSURE AND FORCE TRANSDUCERS OR ACCELEROMETERS

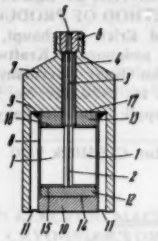
Reto Calderara, Bern; Hans U. Baumgartner, Winterthur; Jan Tichý, St. Gallen, and Hans C. Sonderegger, Neftenbach, all of Switzerland, assignors to Kistler Instrumente AG, Switzerland

Continuation of Ser. No. 234,948, March 15, 1972. This application Jan. 28, 1976, Ser. No. 653,154

Claims priority, application Switzerland, Mar. 15, 1971, 3758/71

Int. Cl.² H01L *41/04*

U.S. Cl. 310—8.7 **13 Claims**



1. A piezoelectric transducer for use in force, pressure and acceleration measuring systems comprising:

at least one transducer element which is prone to twinning;

means for introducing a force to said element; and

means for applying a prestress to said element in at least one direction forming an angle of less than 27° with a direction providing a maximum difference between respective elasticity coefficients of said element for stable and unstable twin forms of said element such that the stable form obtains a thermodynamic preference according to the relationship

$$\Delta G = G - G = \tfrac{1}{2} \sum_{\lambda=1}^{6} \sum_{\mu=1}^{6} (s_{\lambda\mu} - s_{\lambda\mu}) \cdot T_\lambda \cdot T_\mu$$

wherein G represents the elastic free enthalpy, s represents the elastic compliance coefficients of said transducer element, and T represents stress components.

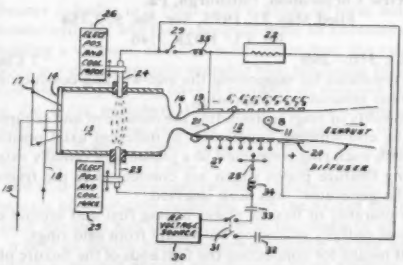
4,016,438
ENTHALPY AUGMENTATION TO MHD GENERATION

James F. Holt, Medway, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 27, 1975, Ser. No. 581,175

Int. Cl.² H02K *45/00*

U.S. Cl. 310—11 **1 Claim**



1. In a MHD generator having at least a thermal efficiency of approximately 20%, a combustion chamber, a MHD channel having a plurality of serially connected electrodes between positive and negative electrical output electrodes with an electrical load connected to the said positive and negative output electrodes, the improvement in the said MHD generator by enthalpy augmentation comprising:

a. a first and a second carbon electrode for providing an electrical arc discharge therebetween;

b. means for positioning the said electrodes to position the said arc discharge in the said combustion chamber;

c. means including a switch cooperating with the said plurality of electrodes and one of the said output electrodes to provide an adjustable voltage; and

d. means for connecting the said adjustable voltage to the said carbon electrodes.

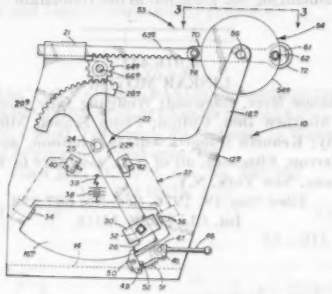
4,016,439
MAGNETICALLY ACTIVATED OSCILLATORY MOTOR

Francis R. Sheridan, 302 - 2nd Ave., Puyallup, Wash. 98371

Filed Oct. 28, 1975, Ser. No. 626,473

Int. Cl.² H02K *33/14*

U.S. Cl. 310—39 **4 Claims**



1. A magnetically activated oscillatory motor comprising

a. mounting means,

b. a pendulum pivotally mounted to the mounting means,

c. a pendulum magnet mounted on the pendulum with its poles aligned to face in the direction of pendulum movement,

d. first and second electromagnets mounted on the mounting means in a fixed, spaced, relation adjacent the opposite extremities of swing of the pendulum with their poles aligned with those of the pendulum magnet and facing the like polarity pole thereof, whereby each electromagnet, when energized, functions to repel the facing pole of the pendulum magnet and urge the pendulum toward its other extremity of swing,

e. electric power means for supplying current to energize the first and second electromagnets,

f. switch means in an electric circuit with the electric power means and the first and second electromagnets and operative to control the flow of current selectively to the first and second electromagnets, mounted on the mounting means for engagement by the pendulum when it is near the extremities of its swing to energize only the electromagnet then adjacent to the pendulum, to effect urging of the pendulum toward its other extremity of swing, and

g. drive means connected to the pendulum to transmit its oscillatory motion to a driven member.

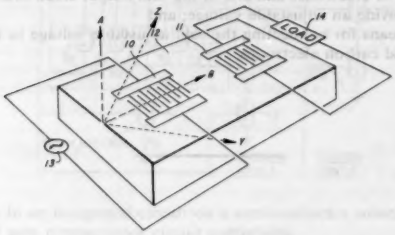
4,016,440
PARTICULARLY ORIENTED PLATE-LIKE MONOCRYSTALLINE PIEZOELECTRIC BODY AND ACOUSTIC SURFACE WAVE FILTER DEVICE EMPLOYING SAME

Robert S. Wagers, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 473,850, May 28, 1974, abandoned. This application May 21, 1975, Ser. No. 579,340

Int. Cl.² H01L *41/04*

U.S. Cl. 310—9.5 **5 Claims**



1. A piezoelectric body for use as a substrate in an acoustic surface wave filter device, said body comprising a monocrystalline member of lithium niobate of plate-like configuration and having a crystalline lattice orientation determined by a cut lying within the range of 60° – 30° (ZYW) cut so as to substantially limit the number of plate modes available for coupling, thereby enhancing the plate mode discrimination.

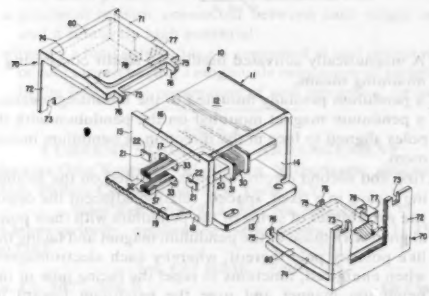
4,016,441
LINEAR MOTOR

John Addison Herr, Garwood; Wolfgang Jaffe, Roselle Park; Allan Matthew Dob, Clifton; Philip Francis Minalga, Piscataway; Kenneth Douglas Adams, Madison, and William Lee Herron, Elizabeth, all of N.J., assignors to The Singer Company, New York, N.Y.

Filed May 19, 1976, Ser. No. 687,858

Int. Cl.² H02K *33/18*

U.S. Cl. 310—13 **8 Claims**



1. A linear motor comprising a ferro-magnetic metal frame including a opposed set of front and rear walls joined by an opposed set of end walls together defining a enclosure, a non-circular ferro-magnetic pole piece spanning one of said sets of opposed frame walls within said enclosure, a bobbin formed of non-magnetizable material arranged freely slidable on said pole piece within said enclosure, wire wound in a coil on said bobbin to a depth of a plurality of wire diameters, a motor output arm connected to said bobbin and extending out through a clearance aperture in said motor frame enclosure, a block of permanently magnetized material in the shape of a parallelepiped of substantially uniform thickness dimension insertible with clearance within said enclosure in the space between said pole piece and a wall of said motor frame with the uniform thickness dimension being arranged extending between said frame wall and said pole piece, and holding means formed of non-magnetic material for constraining said block of permanently magnetized material in a position against said motor frame wall so as to locate all of said clearance between the pole piece and said block of permanently magnetized material.

4,016,442
LIQUID-COOLED ROTOR OF ELECTRIC MACHINES AND METHOD OF PRODUCTION

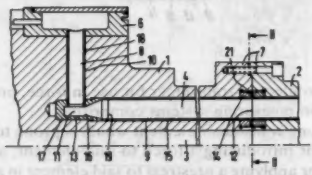
Willi Eggemann, and Erich Weghaupt, both of Mulheim (Ruhr), Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Dec. 16, 1974, Ser. No. 533,318

Claims priority, application Germany, Dec. 20, 1973, 2363644

Int. Cl.² H02k *9/00*

U.S. Cl. 310—59 **6 Claims**



1. A liquid cooled rotor for electric machines comprising shaft means, cooling liquid collecting chambers surrounding said shaft means, said shaft means including a plurality of axial bores for feeding and withdrawing cooling liquid and a plurality of radial bores connecting respective said axial bores to said cooling-liquid collecting chambers, a plurality of thin walled axial tubes and radial tubes of corrosion-resistant material forming linings for respective said axial and radial cooling-liquid bores, said tubes being in firm rolled-in press fitting sealing engagement with the surfaces defining the bores along the entire lengths thereof, and a plurality of diverting members fitted into respective said axial bores at locations whereat said radial bores divert from said axial bores, said diverting members each having an axially disposed opening and a radially disposed opening connecting said axial bores, respectively, with said radial bores.

4,016,443
TURBINE GENERATOR END-WINDING SUPPORT APPARATUS

Larry A. Johnson, Concord, Tenn., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 22, 1975, Ser. No. 579,754

Int. Cl.² H02K *3/46*

U.S. Cl. 310—260 **7 Claims**

1. Apparatus for supporting the end-winding conductors of a turbine generator, comprising:

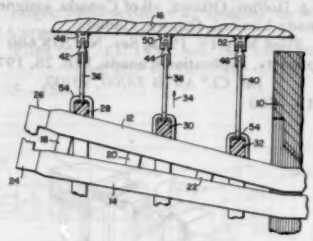
a plurality of rings surrounding the outside of and secured to the end-winding conductors at different axial positions, with each ring connected to a plurality of radially extending flexture plates which are connected to the frame of the generator'' has been inserted;

the plurality of flexure plates having first and second ends and radially extending outwardly from said rings;

first means for connecting the first ends of the flexure plates to said rings; and

second means for connecting the second ends of the flexure

plates to the frame of the generator, said second connecting means preventing axial and radial movement of the



second flexure plate ends and permitting tangential movement of the second flexure plate ends.

4,016,444

ROTOR FOR AN ELECTRIC MACHINE HAVING A CRYO-INDUCTOR

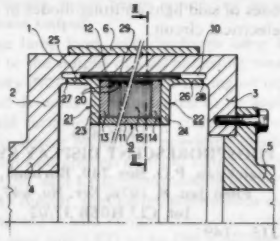
Roger Gillet, Belfort, France, assignor to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM), Paris Cedex and Electricite de France (Service National), Paris, both of, France

Filed Apr. 15, 1975, Ser. No. 568,239

Claims priority, application France, Apr. 17, 1974, 74.13313

Int. Cl.² H02K *1/22*

U.S. Cl. 310—261 **4 Claims**



1. A rotor for an electric rotating machine comprising: a bearer cylinder made of non-magnetic material and constituting the mechanical bearer structure for the rotor, the cylinder being disposed between two portions of the rotor shaft; and a cylindrical body for supporting the rotor inductor winding and having an outside diameter less than the inside diameter of the bearer cylinder, the cylindrical body being disposed coaxially inside the bearer cylinder and being fixed at its axial ends to the bearer cylinder in a fluid-tight manner to form between the bearer cylinder and the cylindrical body an enclosed space for holding a vacuum; and characterized in that: the cylindrical body is a closed annular metallic box; insulating materials fill said annular box and have a plurality of recesses spaced along the outer periphery thereof for accommodating said inductor winding; said recesses extending radially inwardly into said box from the outer periphery thereof for a distance less than the radial thickness of the annulus formed by said box; and said rotor comprises two parts of revolution, each of whose axes of revolution coincides with the axis of the rotor, and each having a half cross-section in the shape of an angle part, a first of whose branches perpendicular to the axis of revolution is applied against and secured to an adjacent axial end of said closed metallic box, whereas the second branch parallel to the axis of revolution is fixed on the rotor by its end.

4,016,445

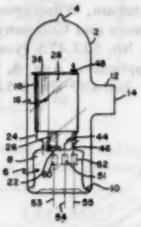
DEUTERIUM ARC LAMP

Robert L. Cassidy, Peabody; Robert J. Cosco, Amesbury, and John A. Pappas, Winthrop, all of Mass., assignors to GTE Sylvania Incorporated, Salem, Mass.

Filed Nov. 28, 1975, Ser. No. 636,325

Int. Cl.² H01J *61/12*

U.S. Cl. 313—185 **7 Claims**



1. A deuterium arc lamp comprising:

an hermetically sealed envelope having an ultraviolet light-transmitting portion;

a pair of electrodes in said envelope between which an arc discharge path is defined during operation of said lamp; and

deuterium gas in said envelope at an initial fill pressure in excess of that at which peak ultraviolet light intensity occurs during operation of said lamp, whereby the useful life of said lamp is substantially extended.

4,016,446

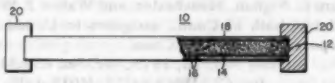
REFRACTORY-OXIDE-BASED INCANDESCIBLE RADIATORS AND METHOD OF MAKING

Laurence H. Cadoff, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 31, 1975, Ser. No. 546,152

Int. Cl.² H01K *1/10*

U.S. Cl. 313—218 **13 Claims**



1. A refractory-oxide-based elongated incandescent radiator body member adapted for operation by application of a predetermined electric potential across the ends thereof, said body member comprising:

a. an elongated member principally comprising sintered refractory oxide which in a pure state appears generally light in color;

b. discrete refractory metal particles dispersed throughout said oxide in amount of from about 8 volume percent to about 20 volume percent of said member, and said member as initially sintered during fabrication thereof having sufficient resistivity that said member will not self-resistance heat to a condition of incandescence upon application of said predetermined electric potential across the ends thereof;

c. said member having been further processed after being initially sintered by heating said member under non-reactive conditions to a temperature of at least about 1400° C while simultaneously placing said member within the influence of an electric field having an intensity of at least about 5 volts/mm but insufficient to cause said member to fracture; and

d. said simultaneously heating and application of said field causing said discrete metal particles to have therebe-

tween sufficient electrical continuity to enable said member to be self-resistance heated to an incandescent state upon application of said predetermined electric potential across the ends thereof.

4,016,447

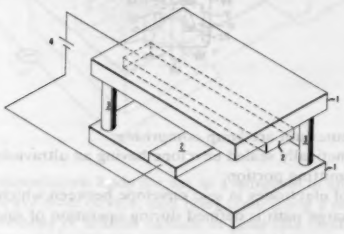
DIELECTRIC SUBSTRATE BEARING NICKEL BORIDE CONDUCTOR

Frank Knowles Patterson, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 523,473, Nov. 13, 1974, Pat. No. 3,943,168. This application Aug. 8, 1975, Ser. No. 603,168

Int. Cl.² H01J *61/06*

U.S. Cl. 313—218 **7 Claims**



1. A dielectric substrate having adherent thereto a sintered composition of finely divided inorganic powder comprising one or more nickel compounds having an overall approximate composition of

$$(Ni_3B)_a(Ni_3Si)_b$$

wherein the sum of a plus *b* is one,
a is in the range ½ to 1, and
b is in the range 0 to ⅔.

4,016,448

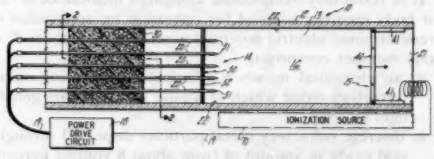
HIGH POWER ELECTRIC DISCHARGE METHOD AND APPARATUS FOR LASER CHEMICAL SYNTHESIS AND OTHER APPLICATIONS

William L. Nighan, Manchester, and Walter J. Wiegand, Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 26, 1975, Ser. No. 635,318

Int. Cl.² H01J *61/28*; **H01S** *3/00*

U.S. Cl. 313—231 **18 Claims**



1. In a convective electric discharge device having a gas convection channel with a gas passageway for the flow of gas in one direction therethrough and plasma generating means for extablishing a gas plasma in an electric discharge region of the gas passsageway, the improvement wherein the plasma generating means comprises a gas pervious cellular baffle extending transversely across substantially the entire gas passageway upstream of the electric discharge region for producing, immediately downstream thereof, a substantially uniform gas velocity profile, and turbulence generator means downstream of the cellular baffle and upstream of the electric discharge region and operable to convert said substantially uniform gas velocity profile to an approximately isotropic and uniform turbulent gas flow in the electric discharge region.

4,016,449

LIGHT EMITTING DIODE DISPLAY

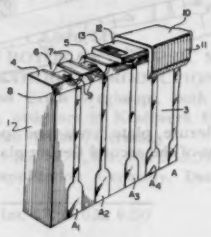
Geoffrey N. Gale, Aylmer; Edwin Denis Colbourne, Carp, and Michael J. Hollins, Ottawa, all of Canada, assignors to Bowmar Canada Limited, Ottawa, Canada

Filed May 19, 1975, Ser. No. 578,600

Claims priority, application Canada, Feb. 28, 1975, 221026

Int. Cl.² A47B *88/00*, *95/00*

U.S. Cl. 313—500 **5 Claims**



1. A display device for displaying signals in response to an external electrical circuit to which it is connected, said device comprising a thin, relatively stiff substrate which has two opposed major faces which are normal to a display face defined by an elongate and substantially planar thin edge of the substrate, a plurality of light emitting diodes positioned in spaced relationship along said display face, an electrical cathode and anode conductor pattern on at least one of said major faces having first common ends terminating proximate said display face and second common ends terminating proximate a thin edge of the substrate other than said display face and wherein said first conductor ends are in electrical interconnection with said light emitting diodes so as to energize at least selected ones of said light emitting diodes in response to said external electrical circuit.

4,016,450

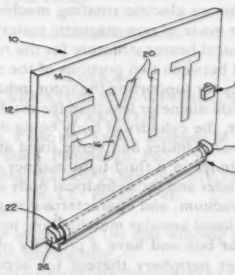
PHOSPHORESCENT DISPLAY SYSTEM

Garbis S. Balekjian, P.O. Box 749, Burbank, Calif. 91503

Filed Jan. 8, 1976, Ser. No. 647,586

Int. Cl.² H05B *37/02*

U.S. Cl. 315—149 **7 Claims**

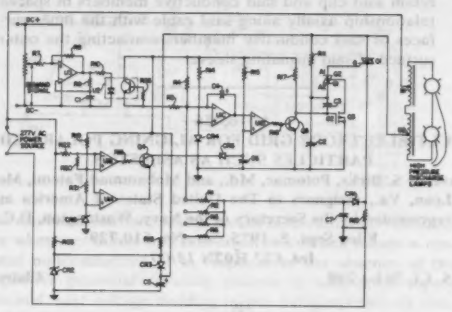


1. A phosphorescent display system comprising:
a phosphor material;
a source of activating radiation in operative relation with said material;
a power supply for energizing said source;
selectively actuatable control means for momentarily operatively connecting the power supply to said source;
and sensor means responsive to the luminosity of the phosphor material for actuating the control means.

4,016,451
HIGH PRESSURE DISCHARGE LAMP DIMMING CIRCUIT UTILIZING VARIABLE DUTY-CYCLE PHOTOCOUPLER

Joseph C. Engel, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 13, 1975, Ser. No. 558,109
Int. Cl.² H05B *37/02*
U.S. Cl. 315—158 **4 Claims**



1. A lighting control apparatus to provide variable intensity light from a high-pressure discharge lamp load utilizing a photocoupler actuated by a variable duty-cycle circuit which varies the ON time of an LED in response to an externally generated electrical demand signal, said apparatus comprising:

a. power control means having a signal input, a power input, and a power output, said power input being adapted to be connected to a source of AC power;

b. ballasting means having an input and an output, said ballasting means input being connected to said power control means output;

c. a discharge lamp load, said discharge lamp load being connected to the output of said ballasting means;

d. variable duty-cycle circuit means having an input and an output, said demand signal adapted to be applied to the input of said variable duty-cycle circuit means; and

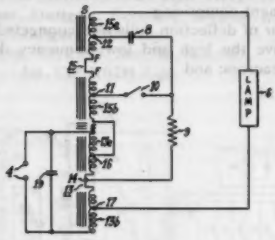
e. LED-photoresistor means for providing electrical isolation between said applied demand signal and said power control means, said LED-photoresistor means having an input and an output, said LED-photoresistor means input being connected to said variable duty-cycle circuit means output to cause said LED to be ON a percentage of the time which is proportional to the value of said demand signal, and said LED-photoresistor means output being connected to said signal input of said power control means.

4,016,452
LAMP BALLAST CIRCUIT

Candler A. Willis, Zirconia, N.C., assignor to General Electric Company, New York, N.Y.

Filed Jan. 14, 1975, Ser. No. 540,881
Int. Cl.² H05B *41/231*
U.S. Cl. 315—278 **18 Claims**

1. A starting and operating circuit for gaseous discharge lamps comprising, in combination, a source of alternating current, ballasting means connected at its input side to said alternating current source, discharge lamp means connected to the output side of said ballasting means, said ballasting means comprising a pair of series connected coils each having a plurality of turns, and high voltage starting means having a series discharge loop including a predetermined number of

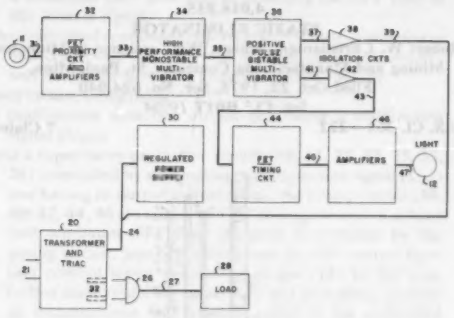


turns of each of said coils for providing high voltage, high frequency starting pulses on said discharge lamp means.

4,016,453
PROXIMITY PAD WITH CONTROLLED ILLUMINATION

Herald Richard Moennig, 716 Inverrary Lane, Deerfield, Ill. 60015

Filed Mar. 15, 1976, Ser. No. 667,114
Int. Cl.² H05B *37/02, 39/06*
U.S. Cl. 315—312 **9 Claims**



1. Apparatus comprising a control unit and a load switching unit; said load switching unit including a switching device coupled between an electric source and a load, and a control lead to the switching device from the control unit; said control unit comprising a metal touch element, an electric light, and control circuits; said control circuits having an input connection from the metal element, a first output connection to the electric light, and a second output connection to said control lead; means for normally supplying current to the electric light to energize it for a low level of illumination; means actuated each time said metal touch element is touched for changing a signal at the second output connection to switch said switching device between on and off to thereby alternately energize and de-energize the load; and means effective when the switching device is switched to off for supplying current via said first output connection to energize said electric light to a high level of illumination and to return it to the low level after a predetermined interval of time.

4,016,454
THREE LARGE SIGNAL DEFLECTION SYSTEM

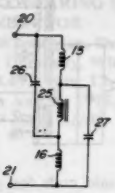
Jacek Antoni Persidok, Addison, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 2, 1975, Ser. No. 574,065
Int. Cl.² H01J *29/70*
U.S. Cl. 315—409 **6 Claims**

6. In a deflection system for controlling the position of the electron beam on the face of a cathode ray tube including a relatively low frequency deflection signal for moving the beam in substantially equal steps across the face in a predetermined

direction and a relatively high frequency deflection signal for moving the beam linearly in the predetermined direction a distance less than the distance between the equal steps, the improvement comprising:

a. a pair of deflection coils interconnected and adapted to receive the high and low frequency deflection signals thereacross; and



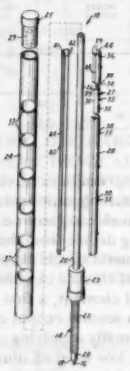
b. inductance means electrically interposed between said deflection coils and capacitance means connected in parallel with said inductance and a respective one of said deflection coils so as to electrically connect said deflection coils in series for low frequency deflection signal operation and in parallel for high frequency deflection signal operation.

4,016,455

STATIC ELIMINATOR

Robert W. Christiansen, Amery, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 22, 1975, Ser. No. 624,940
Int. Cl.² H01T *19/04*
U.S. Cl. 361—222 **7 Claims**



1. A static eliminator comprising:

a cable including a central conductor adapted for connection to a source of alternating high potential and a thick cylindrical insulating sleeve around the conductor;

a plurality of conductive members each including an elongate thin walled channel generally half-cylindrical in cross section, said channel having an outer surface, an inner surface conforming to the outer surface of said insulating sleeve, opposed axially extending edges along junctures of said inner and outer surfaces which edges are spaced to afford free movement of the inner surface of the channel into engagement with the cable in a direction radial of said cable, and a needle connected to said channel and projecting outwardly from said outer surface, said needle being disposed to project generally radially away from said cable when the inner surface of said member is disposed against said insulating sleeve; and

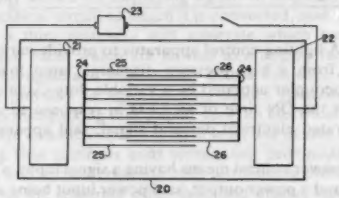
an elongate clip formed of a flexible resilient electrically insulating material having a curved wall generally C-shaped in cross section, said curved wall having axially spaced openings adapted to receive the needles of said conductive members with said channels spaced axially along the clip, and said clip being positioned over the channels of said conductive members with said needles in said openings and over said cable with the opposed ends of said wall in engagement with said cable to releasably retain said clip and said conductive members in spaced relationship axially along said cable with the inner surfaces of said conductive members contacting the outer surface of said insulating sleeve.

4,016,456

MULTIELECTRODE GRID FOR ALIGNING POLARIZED PARTICLES SUCH AS ASBESTOS

Laverne S. Birks, Potomac, Md., and Mohammad Fatemi, Mc Lean, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 5, 1975, Ser. No. 610,729
Int. Cl.² H02N *13/00*
U.S. Cl. 361—288 **1 Claim**



1. A multi-electrode assembly for aligning polarizable particles in a dielectric medium parallel with each other and in parallel rows which comprises:

a quartz base having a top surface;

first and second spaced conductors on top of said base surface;

a pair of spaced parallel-feed conductors on top of said base surface in parallel alignment with said first and second spaced conductors and electrically connected thereto; and

a plurality of parallel interspaced chromium electrodes on top of said base surface secured at one end to alternately to one each of said pair of parallel-feed conductors perpendicular thereto with their non-connected ends spaced from said feed conductor to which they are not connected,

said chromium electrodes having a width of substantially from 40–80 μm; a thickness of substantially from 800–2000 Angstroms and spacing between adjacent conductors of substantially 0.80 mm.

4,016,457

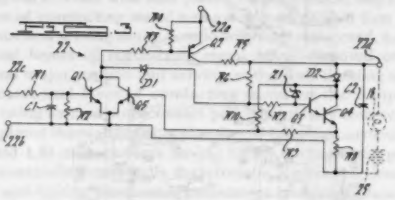
FAILSAFE SYSTEM FOR SKID CONTROL SYSTEMS AND THE LIKE

John S. Frait, Ann Arbor, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.

Division of Ser. No. 408,104, Oct. 19, 1973, Pat. No. 3,891,279. This application Apr. 10, 1975, Ser. No. 566,767
Int. Cl.² H02H *3/24*
U.S. Cl. 361—49 **6 Claims**

1. A failsafe circuit means comprising an input terminal, an output terminal, and a pair of supply terminals for respectively receiving from a single source a supply potential and a ground potential, means forming an input circuit operatively coupled with said input terminal and one of said pair of supply terminals, means forming an output circuit operatively coupled with said output terminal and the other of said pair of supply

terminals, said input circuit comprising first normally conductive electronic switch means that is rendered non-conductive in response to the absence of either an input signal normally applied to said input terminal or the respective potential normally present at said one supply terminal, said output circuit means comprising a second normally conductive electronic switch means and a voltage dividing means, means operatively coupling said input circuit and said output circuit such that



said second electronic switch means is rendered non-conductive whenever either said first electronic switch means is rendered nonconductive or in response to the absence of the respective potential normally present at said other supply terminal, said voltage dividing means being operatively coupled with said output terminal for supplying at said output terminal an output signal which is a fraction of said supply potential whenever both of said electronic switch means are conducting.

4,016,458

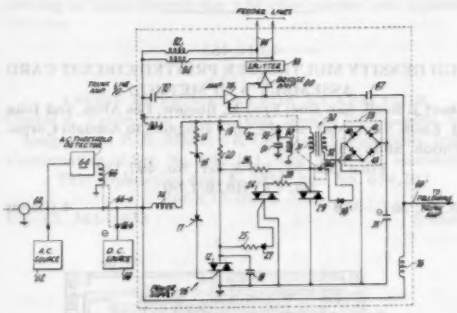
RADIO FREQUENCY DISTRIBUTION NETWORK STANDBY POWER SYSTEM WITH OVERVOLTAGE PROTECTION

Norman Everhart, Richboro, Pa., assignor to Jerrold Electronics Corporation, Horsham, Pa.

Continuation-in-part of Ser. No. 543,452, Jan. 23, 1975, Pat. No. 3,979,644. This application Jan. 28, 1976, Ser. No. 653,088

Int. Cl.² H02H *9/04*

U.S. Cl. 361—52 **18 Claims**



1. In combination, a transformer including primary and secondary windings, controlled bidirectional switch means connected to one terminal of said transformer primary winding, rectifier means connected to said transformer secondary winding, first and second circuit terminals adapted for connection to an energy source, means for quiescently biasing said controlled bidirectional switch means to a conductive state, means responsive to the AC potential obtaining between said first and second energy receiving circuit terminals exceeding predetermined upper and lower bounds for disabling conduction in said bidirectional controlled switch means, and coupling means connected to the junction between said transformer primary winding and said controlled bidirectional switch means for supplying potential to said rectifier means when an AC overvoltage or a DC voltage condition is present between said first and second terminals.

4,016,459

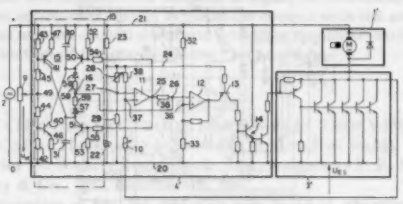
PROTECTIVE SYSTEM FOR INTERMITTENTLY OPERATING SEMICONDUCTOR SWITCH

Andreas Boehringer, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Aug. 12, 1975, Ser. No. 604,007

Int. Cl.² H02H *3/20*

U.S. Cl. 361—88 **18 Claims**



1. Protective system for an intermittently operating semiconductor switch (**3**), said switch comprising

an astable circuit means (**9, 15**) generating a cyclical ON-OFF control signal having a predetermined duty cycle and including a timing circuit (**30, 40; 42, 44, 46**) having a minimum OFF time and determining the OFF time of the control signal;

the controlled semiconductor switch (**3**) being connected to and controlled by said control signal generating means, and having its switching state controlled thereby;

said system comprising

a malfunction detection circuit generating a malfunction signal (U_{KS});

and a supervisory protective circuit (**10, 11, 27, 37, 25, 35, 26**) controlled by said malfunction detection signal (U_{KS}) and having its output connected to, the timing circuit (**30, 40; 42, 44, 46**) to initate an OFF timing interval of at least said minimum OFF time duration determined by the timing circuit, and hence interrupt the ON control from said control signal generating means (**15**) to the controlled semiconductor switch (**3**) and providing, instead, an instantaneous OFF control signal to the controlled semiconductor switch (**3**), said minimum OFF timing interval being selectable independently of the ON-OFF timing of said cylical ON-OFF control signal generated by the astable circuit means; said astable circuit means (**9, 15**) generating the cyclical ON-OFF control signal reverting to the ON state elapse of at least the minimum OFF time interval controlled by the timing circuit thereof.

4,016,460

ELECTRONIC PROTECTION FOR POWER AMPLIFIER

Bertold Stadler, 49 Angelhof, 6901 Wilhelmsfeld near Heidelberg, Germany

Filed Feb. 4, 1975, Ser. No. 546,871

Int. Cl.² H02H *7/20*

U.S. Cl. 330—207 P **6 Claims**

1. An overload protection circuit for a power amplifier (**6**) having an input terminal and an output terminal, supply means (**2**) for supplying an input signal to said amplifier input terminal, a load (**22**), and means (**7–10**) for connecting said amplifier output terminal with said load, said overload protection circuit comprising

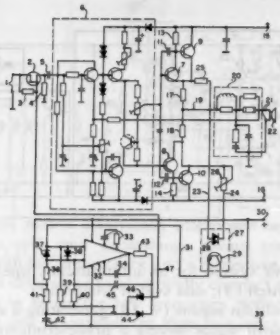
a. bistable means (**32**) operable alternately between a normal first condition and a second condition, said bistable means including a pair of input terminals and an output terminal;

b. means (**36**) for supplying a reference voltage to one input terminal of said bistable means;

c. transducer means (**27**) for supplying to the other input terminal of said bistable means a control voltage that is a function of the output voltage of said power amplifier,

said bistable means being tripped from said first condition to said second condition when said power amplifier output signal exceeds a predetermined value;

d. means (47) for connecting the output terminal of said bistable means with said input signal supply means, said bistable means being operable in said second condition to temporarily deactivate said input signal supply means and



thereby eliminate the overload condition appearing at the output terminal of said power amplifier, whereby said bistable means is tripped back to its first condition; and

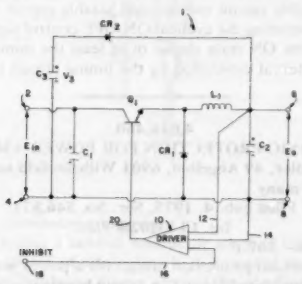
e. timing means (42) for maintaining the input signal supply means (2) in the deactivated condition for a given period of time after the bistable means has been tripped back to it first condition.

4,016,461

STARTING CIRCUIT FOR SWITCHING REGULATOR

John Thomas Roland, Manheim, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed May 6, 1976, Ser. No. 683,971
Int. Cl.² G05F 1/58
U.S. Cl. 361—18 **2 Claims**



1. In a switching regulator for controlled output voltage having an input for unregulated DC and a switching transistor connected between a charging capacitor and an output load capacitor, the improvement comprising:

an energy storing capacitor in parallel with both said charging capacitor and said switching transistor, and

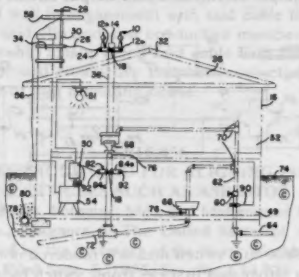
a rectifier between said energy storing capacitor and said output load capacitor, whereby the energy dissipated from said charging capacitor through said switching transistor is lessened by the energy dissipated from said energy storing capacitor directly to said output load capacitor upon turn-on of said switching transistor.

4,016,462

BUILDING LIGHTNING PROTECTION SYSTEM

William Pavliny, 4722 N. Delphia Ave., Chicago, Ill. 60656

Filed Dec. 18, 1975, Ser. No. 641,881
Int. Cl.² H02H 3/22
U.S. Cl. 361—117 **10 Claims**



1. In a roof-covered building with inside plumbing including a waste piping system, said system comprising a vent stack leading from within an upper portion of the building toward the roof and having a projecting end section extending through an opening in the roof from therebelow to an outside point above the roof, a soil pipe at the building site in, and forming a highly conductive ground with, the earth, and a series of interconnected waste pipes in the building between and connecting the vent stack above and the soil pipe below and completing the grounded waste piping system:

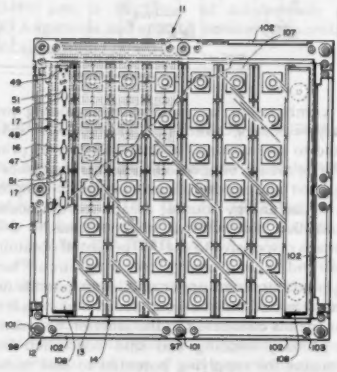
the combination with the waste piping system, of electrically conductive lightning prevention means supported in conductive relation on the projecting end section of the vent stack, the first said means including a charge-accumulating ball, conductive bracket means connecting the first said means to the stack projecting end section, and a generally upright sharp pointed, space discharge electrode atop the ball.

4,016,463

HIGH DENSITY MULTILAYER PRINTED CIRCUIT CARD ASSEMBLY AND METHOD

Robert J. Beall, San Jose; Fred K. Buelow, Los Altos, and John J. Zasio, Sunnyvale, all of Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.

Filed Oct. 17, 1973, Ser. No. 407,181
Int. Cl.² H02B 1/00
U.S. Cl. 361—383 **4 Claims**



1. In a high density multi-layer printed circuit card assem-

bly, a plurality of layers of insulating material, a plurality of spaced layers of conducting metal carried by said layers of insulating material, said layers of insulating material and said layers of conducting metal being laminated to form a card having first and second parallel planar major outer surfaces, said layers of metal having predetermined patterns, said card having a plurality of plated through holes extending through said card, said layers of conducting metal having portions in electrical contact with said plated through holes, one of said layers of conducting metal being disposed on said first major surface and serving as the component side of the card, another of said layers of conducting metal being disposed on said second major surface and serving as the wire bonding side of the card, said layer of conducting metal on the component side being formed with contact pads electrically connected to said plated through holes, a plurality of LSI chip carriers, each of said LSI chip carriers having signal, voltage and ground leads extending outwardly therefrom in a predetermined pattern and having their outer extremities lying in a plane, said layer of conducting metal on the component side also being formed with a plurality of signal, voltage and the ground pads arranged in predetermined patterns corresponding to the predetermined pattern of the outer extremities of the leads of the LSI chip carriers, said layer of conducting metal on the component side including connecting links for connecting the signal, voltage and ground pads to the contact pads, means connecting the leads of the LSI chip carriers to said signal, voltage and ground pads with the LSI chip carriers lying in a plane generally parallel to the card, said LSI chip carriers having cooling studs extending outwardly therefrom in a direction perpendicular to and away from the plane of the card, said LSI chip carriers being mounted in spaced parallel rows, a plurality of resistor packs mounted on said card in spaced parallel rows between said LSI chip carriers, and a cover secured to said card and overlying the component side of the card to provide an air channel between the card and the cover for the passage of air over the LSI chip carriers and the resistor packs in a direction parallel to the rows of LSI chip carriers and resistor packs wiring separate from the layers of metal carried by the card on the wire bonding side of the card for electrically interconnecting certain of the contact pads and serving to interconnect the LSI chip carrier into operative circuitry.

4,016,464

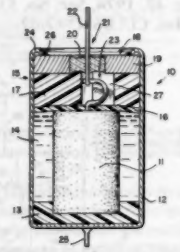
ANODE RISER MEANS FOR A CAPACITOR

Gerald A. Voyles, and Paul S. Deak, both of Indianapolis, Ind., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Continuation of Ser. No. 502,201, Aug. 30, 1974, abandoned. This application Apr. 5, 1976, Ser. No. 674,203

Int. Cl.² H01G *9/00*

U.S. Cl. 361—433 **5 Claims**



1. A capcitor comprising a housing having an open end, a sintered dielectric oxide film-forming metal anode means having a myriad of intercommunicating voids, a liquid type electrolyte contacting the anode means, rigid means closing the open end of the housing and edges of the housing compressively acting on the rigid means and thereby on the anode means, resilient means interposed between the anode means and the rigid means, surfaces of the resilient means contacting the anode means and the rigid means to help maintain the anode means in the fixed spatial relationship relative to the housing, and anode riser means capable of absorbing compressive forces projecting through the resilient means, the anode riser means having two distal ends and comprising at least one continuous length of metal and at least a portion of at least one length in the shape of a bight, the first distal end of the anode riser means in electrical contact with the anode means and the second distal end providing means for external termination of the anode means.

4,016,465

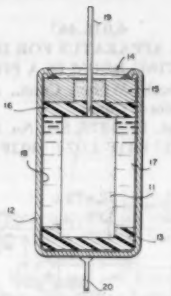
CATHODE ELECTRODE FOR AN ELECTROLYTIC CAPACITOR AND METHOD OF MAKING SAME

Charles W. Walters, Indianapolis, Ind., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Continuation of Ser. No. 495,570, Aug. 8, 1974, abandoned. This application Apr. 30, 1976, Ser. No. 681,924

Int. Cl.² H01G *9/00*

U.S. Cl. 361—433 **9 Claims**



1. A capacitor comprising an anode electrode, cathode electrode, and dielectric means between the anode electrode and the cathode electrode, the cathode electrode including a surface containing Cu contacted by at least semi-liquid electrolyte, and a composition on the cathode electrode surface containing at least one compound selected from the group of copper selenide, copper telluride and copper sulfide.

4,016,466

SUBMINIATURIZED ADJUSTABLE CAPACITOR

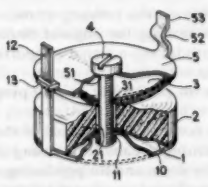
Pierre Frappart, Montreuil-Sous-Bois, France, assignor to L.C.C.-C.I.C.E.-Compagnie Europeenne de Composants Electroniques, Paris, France

Filed Mar. 25, 1975, Ser. No. 561,703

Claims priority, application France, Mar. 29, 1974, 74.11330

Int. Cl.² H01G *5/22*

U.S. Cl. 361—278 **7 Claims**



1. A subminiaturized adjustable capacitor comprising:
a first electrode having a fixed non-deformable surface;
a dielectric superimposed on the first electrode;

a second electrode having a conductive mass composed at least partially of a non-metallic elastic material, the conductive mass being provided with a resilient reinforcement and with only a portion of the conductive mass being in contact with the dielectric at the minimum capacitive value;

adjuster means for controllably applying pressure to progressively deform the conductive mass of the second electrode and bring larger portions thereof into contact with the dielectric, whereby the capacitance of the capacitor can be made to vary continuously between a minimum value and a maximum value; and

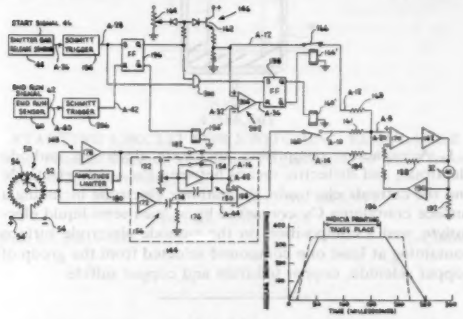
a movable non-deformable plate separated from the first electrode by the dielectric and the second electrode and responsive to the controllable application of pressure by the adjuster means for movement in a direction perpendicular to the fixed non-deformable surface of the first electrode.

4,016,467

SERVODRIVE APPARATUS FOR DRIVING THE POSTAGE PRINTING DRUM IN A POSTAGE METER

Richard A. Hallenbeck, Wilton, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Mar. 10, 1975, Ser. No. 556,711
Int. Cl.² B41F *13/24*; H02P *5/06*
U.S. Cl. 318—604 **19 Claims**



1. In a postage meter having a postage printing drum mounted for rotation from and to a home position in single revolution increments and means for transporting individual pieces of mail, each at substantially the same speed with respect to each other, said pieces of mail being delivered into operative engagement with the incrementally rotating drum to be printed with postage at a fixed location on each of said pieces of mail, a servodrive apparatus for driving the drum and for controlling the angular velocity of the drum to be substantially equal to a preset angular velocity, said servodrive apparatus comprising:

drive means for driving the printing drum;

sensing means for sensing the angular displacement of the drum and for producing a signal proportional to the developed angular velocity;

a signal generator for producing a signal proportional to the preset angular velocity;

a comparator for receiving the signals of the signal generator and said sensing means for sensing the angular displacement of the drum and for producing a signal proportional to the developed angular velocity;

a comparator for comparing the sensed angular velocity of the drum and the preset angular velocity; and

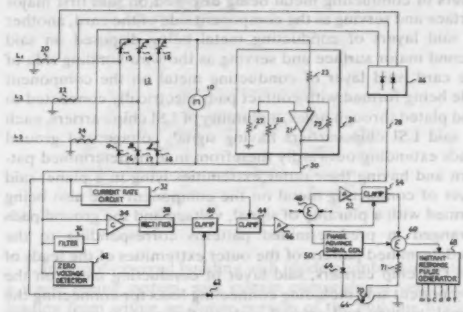
control means operatively connected and responsive to said drum substantially at the preset angular velocity.

4,016,468

CONTROLLED RECTIFIER MOTOR DRIVE SYSTEM INCLUDING D.C. FAULT DETECTION AND COMMUTATION MEANS

Carlton E. Graf, Erie, Pa., assignor to General Electric Company, Erie, Pa.

Filed Mar. 18, 1975, Ser. No. 559,612
Int. Cl.² H02K *23/66*
U.S. Cl. 318—434 **10 Claims**



1. In a motor control system of the type in which a d.c. motor is supplied with power from an a.c. source by way of a rectifier bridge the individual rectifiers of which are rendered conductive in a prescribed sequence and at controllable times, means for detecting the existence of an improperly conducting rectifier and for providing remedial action with respect thereto comprising:

a. means for providing a first control signal in response to a substantial difference between the value of the output voltage of the bridge and the counter electromotive force of said motor;

b. means for providing a second control signal in response to a decrease in value in the alternating current supplied to said bridge from said source;

c. means for providing a third control signal in response to the value of the motor terminal voltage being at substantially zero volts; and,

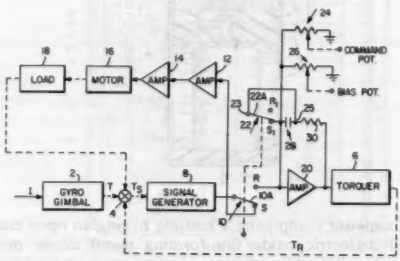
d. means responsive to said first, second and third control signals to effect a change in the time of rendering conductive at least one of the rectifiers of the bridge.

4,016,469

SENSOR INCLUDING MEANS FOR OPERATING THE SENSOR IN RATE MEASURING AND STABILIZATION MODES

Michael J. Lanni, Ridgewood, N.J., and John Calamera, Staten Island, N.Y., assignors to The Bendix Corporation, Teterboro, N.J.

Filed Dec. 17, 1974, Ser. No. 533,606
Int. Cl.² B64C *17/02*
U.S. Cl. 318—590 **5 Claims**



1. A sensor system, comprising:

a sensor;

sensing means for providing a signal corresponding to a sensed condition;

first and second driving means;

the first driving means including an amplifier selectively connected to the sensing means through the switching means for amplifying the signal therefrom, and a torquer connected to the amplifier and to the sensor and responsive to the amplified sensing means signal for torquing the sensor to null;

switching means connected to the sensing means and operable for selectively connecting the first and second driving means to the sensor in closed loop configuration;

the switching means including first and second ganged switches, the first switch being operable for selectively connecting the first and second driving means to the sensor, and the second switch being operable with the first switch for connecting circuit means to the amplifier for affecting operation of said amplifier; and

the circuit means including a capacitor connected to the second switch, a resistor serially connected to the capacitor and connected intermediate the amplifier and torquer, the resistor shunting out the capacitor for providing a linearized current flow when the second switch is operated with the first switch so that the second driving means is connected to the sensor in closed loop configuration, with the sensor being thereupon in the stabilization mode, and the capacitor providing a predetermined frequency response when the second switch is operated with the first switch so that the first driving means is connected to the sensor in closed loop configuration, with the sensor being thereupon in the rate measuring mode.

4,016,470

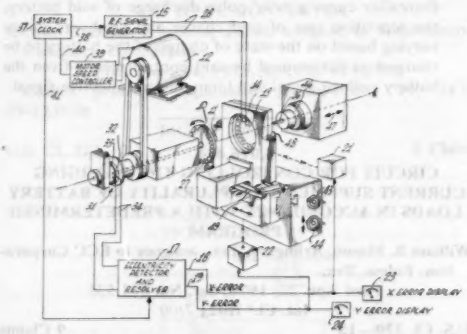
ELECTRICAL CENTERING AND BORING SYSTEM FOR TRANSDUCERS

Andrew Gabor, Alamo, and Kenneth W. Cocksedge, Pleasanton, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed May 19, 1975, Ser. No. 578,454

Int. Cl.² B23B *49/00*; H02K *15/16*

U.S. Cl. 318—606 **30 Claims**



1. A method of generating a signal indicative of the eccentricity of an angular position transducer element, comprising the steps of:

placing a blank transducer element in an operative relationship with a master transducer element;

rotating one of the transducer elements with respect to the other about an axis of relative rotation, the master element being deliberately eccentric with respect to the axis of relation rotation;

energizing one of the transducer elements and thereby inducing a corresponding signal in the other; and

processing the induced signal to derive therefrom an error signal indicative of the eccentricity of the blank element with respect to the axis of relative rotation.

11. Apparatus for electrically locating the center of an angular position transducer element for subsequent boring, said apparatus comprising:

means for holding a blank transducer element to be bored and a master transducer element in an operative relationship with each other;

means for rotating one of the transducer elements with respect to the other at a constant speed about an axis of relative rotation, the master transducer element being deliberately eccentric with respect to the axis of rotation;

signal generation means coupled with one of the transducer elements thereby to produce an induced signal in the other;

signal processing means couple to receive the induced signal, for deriving therefrom an eccentricity error signal indicative of any eccentricity of the blank transducer element with respect to the axis of relative rotation;

error signal resolution means for resolving the derived error signal into orthogonally related components; and

means for moving the blank transducer element in orthogonally related axes perpendicular to the axis of relative rotation until the resolved components of the error signal are zero and the blank element is therefore concentric with the axis of relative rotation.

4,016,471

LEVEL DETECTION SYSTEM HAVING A BAND-PASS CHARACTERISTIC AND A SERVO SYSTEM INCLUDING THE SAME

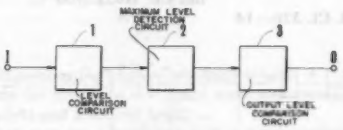
Seiichi Matsumoto, Yokohama, and Kazuya Hosoe, Machida, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 6, 1974, Ser. No. 467,578

Claims priority, application Japan, May 11, 1973, 48-52217

Int. Cl.² G05B *11/01*

U.S. Cl. 318—629 **11 Claims**



1. A servo control system of the type in which a signal of a recurrence frequency from an input circuit, such as a modulating signal after being demodulated to obtain a signal of the same recurrence frequency is supplied to a servo system including a servo motor, thereupon said servo system being made operative, said servo control system comprising: a level comparison circuit having an input to receive said recurrence frequency signal and reference signal and also having an output;

wide-band filter means coupled electrically to the output of the comparison circuit, the filter means having a characteristic for passing therethrough a signal of the recurrence frequency and its side-band frequencies;

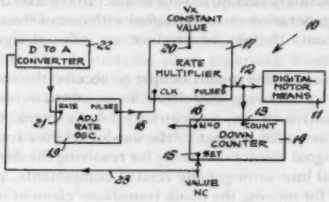
control circuit means coupled to the filter means for producing a control signal for regulating the servo motor, the circuit means having an output of a predetermined saturation characteristic;

whereby the signal from the comparison circuit is changed through the filter means into the control signal for regulating the motor.

4,016,472
NON-LINEAR VELOCITY CHANGE CIRCUIT FOR CONSECUTIVE LENGTH COMMANDED DIGITAL MOTOR MEANS

Albert C. Leenhouts, Harwinton, Conn., assignor to The Superior Electric Company, Bristol, Conn.

Filed Jan. 17, 1975, Ser. No. 542,057
Int. Cl.² G05B 79/40
U.S. Cl. 318—696 8 Claims

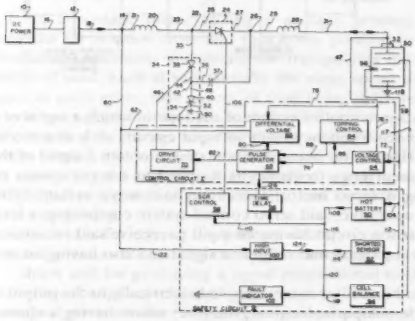


1. In a motion control system for producing a movement consisting of a plurality of successive lengths with there being a command for each length that includes the extent of the length as defined by the number of steps therein, comprising means for receiving the command and producing essentially the number of motor pulses corresponding to the extent at a somewhat constant rate, said command containing information only relating to the extent of the length and digital motor means for receiving the motor pulses and producing a movement corresponding thereto, the improvement comprising non-linear velocity change means including pulse rate setting means for setting the rate of the motor pulses in a length and pulse rate controlling means connected to the pulse rate setting means for receiving information of the number of pulses in a length and setting the rate of the pulses in the length in accordance with the extent of the length.

4,016,473
DC POWERED CAPACITIVE PULSE CHARGE AND PULSE DISCHARGE BATTERY CHARGER

William Newman, Salt Lake City, Utah, assignor to Utah Research & Development Co., Inc., Salt Lake City, Utah

Filed Nov. 6, 1975, Ser. No. 629,285
Int. Cl.² H02J 7/00
U.S. Cl. 320—14 10 Claims



1. A battery charger comprising:

power connector means for removable conductive connection to an external source of direct current power;

a first node conductively connected to said power connector to receive and transmit electrical energy;

a first inductor to receive, store and transmit received and stored electrical energy having an input conductively connected to said first node and an output;

a second node conductively connected to said output of said first inductor to receive and transmit electrical energy;

first switching means having an output and an input which is conductively connected to said second node, and having a first state in which said switching means is conductive to receive and transmit electrical energy received from said second node and a second state in which said switching means is nonconductive to not transmit electrical energy, said switching means automatically switching between said first state and said second state in accordance with preselected electrical signals sensed by said switching means;

a third node conductively connected to said output of said first switching means to receive and transmit electrical energy;

a second inductor to receive, store and transmit received and stored electrical energy having an input conductively connected to said third node and having an output;

output connector means conductively connected to said output of said second inductor which is removably conductively connectable to a battery to be charged to receive and transmit electrical energy;

a capacitor conductively connected to said third node to receive, store and transmit electrical energy;

second switching means conductively connected to said capacitor and to said second node to switch said capacitor between a series circuit and parallel circuit configuration with respect to said first and second inductors;

temperature sensing means positioned to sense the temperature of the battery to be charged and generate an electrical signal reflective of said temperature;

control means conductively connected to said first node to receive electrical energy therefrom, to said temperature sensing means to receive said temperature reflective electrical signal therefrom, to said battery to receive an electrical signal reflective of the voltage across said battery, and to said second switching means to supply control signals thereto, said control means generating said control signals to repetitiously cause said capacitor to be first charged in parallel circuit through said first switching means and discharged in series with said first and second inductors to pulse charge said battery to be charged and thereafter cause a brief pulse discharge of said battery, the repetition rate of said charge and discharge pulses varying based on the state of charge of the battery to be charged as determined by said control means from the battery voltage signal and temperature reflective signal.

4,016,474
CIRCUIT FOR CONTROLLING THE CHARGING CURRENT SUPPLIED TO A PLURALITY OF BATTERY LOADS IN ACCORDANCE WITH A PREDETERMINED PROGRAM

William B. Mason, Arlington, Tex., assignor to ECC Corporation, Euless, Tex.

Filed Apr. 25, 1975, Ser. No. 571,535
Int. Cl.² H02J 7/00
U.S. Cl. 320—15 9 Claims

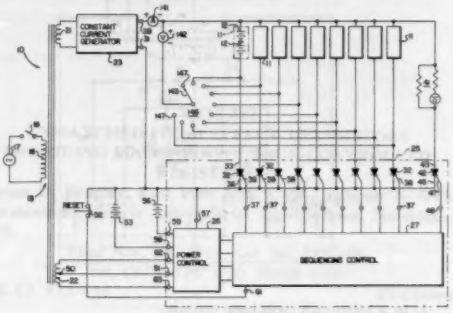
1. In a circuit for controlling the charging current applied to a plurality of battery loads in accordance with a predetermined program including first and second terminals for connection to a current source, means for connecting one side of each of a plurality of battery loads to said first terminal and a program sequencer for selectively connecting the other side of each of said battery loads to the second terminal, the improvement wherein said program sequencer comprises:

a plurality of controlled switching devices each having first and second power electrodes and a control electrode, said first power electrode of each of said control switching devices for connecting to the other side of a corresponding battery load;

means connecting said second power electrode of said controlled switching devices to said second terminal;

programmable control means coupled to the control electrodes of said controlled switching devices for selectively impressing a triggering potential on each controlled switching device for a first predetermined time in a predetermined sequence and for repeating said sequence after a second predetermined time, said programmable control means including:

counter means having an input and a plurality of outputs exceeding the number of loads by unity and responsive to successive pulses at said input for consecutively actuating said outputs in a predetermined sequence;



means coupling each of said controlled electrodes of said plurality of controlled switching devices to a corresponding one of a like plurality of consecutively actuable outputs of said counter means;

clock pulse generating means coupled to the input of said counter means for consecutively actuating the outputs of said counter means and including means responsive to the remaining output of said counter means for controlling the duration of the output pulses of said clock pulse generating means; and

means for connecting said programmable control means to a cource of operating potential.

4,016,475

DC TO DC CONVERTER

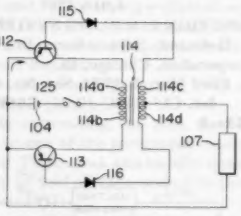
Hiroshi Makino, Hirakata, Japan, assignor to West Electric Company, Ltd., Japan

Filed Nov. 14, 1975, Ser. No. 631,873

Claims priority, application Japan, Nov. 19, 1974, 49-133938

Int. Cl.² H02M *3/335*

U.S. Cl. 321—2 **5 Claims**



1. A DC to DC converter comprising:

a saturable inverter transformer having primary and secondary windings;

a push-pull oscillation circuit having a pair of transistors whose collectors are connected to opposite end terminals of the primary winding of said saturable inverter transformer respectively;

a DC source being connected between the emitters of said transistors and a midpoint of said primary winding of said saturable inverter transformer;

a condenser being connected between said secondary winding of said saturable inverter transformer and said emitters of said transistors;

a first reactance element connected in series with one terminal of the secondary winding of said saturable inverter transformer;

a resistor connected between the collector of one of said transistors and the base of the other transistor;

a first diode connected between said first reactance element and the base of one of said transistors, the easy conduction direction of said first diode being towards one side of said condenser; and

a second diode connected between the base of the other of said transistors and the other terminal of the secondary winding of said saturable inverter transformer, the easy conduction direction of said second diode being towards said one side of said condenser. (FIGS. 6 and 7)

4,016,476

BOOSTER CIRCUITS

Shigeru Morokawa, and Fukuo Sekiya, both of Tokorozawa, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

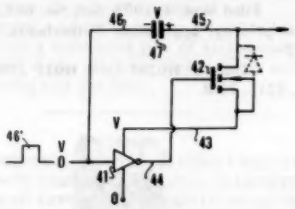
Continuation of Ser. No. 397,249, Sept. 14, 1973, abandoned.

This application Nov. 11, 1975, Ser. No. 630,811

Claims priority, application Japan, Sept. 20, 1972, 47-94393; Sept. 26, 1972, 47-95751; Sept. 27, 1972, 47-96097; Oct. 5, 1972, 47-100157

Int. Cl.² H02M *7/00*

U.S. Cl. 321—15 **19 Claims**



1. In a voltage-boosting circuit, in combinations:

input means for supplying a voltage wave alternating between a first and a second level;

a field-effect transistor provided with a semi-conductive substrate, a source electrode connected directly to said substrate, a drain electrode coupled to said substrate through a P/N junction with a predetermined threshold voltage, said drain and source electrodes being located at opposite ends of a channel region of said substrate, and a gate controlling the conductivity of said channel region;

circuit means connecting said source electrode to a point of fixed reference potential;

a first lead extending from said input means to said drain electrode for delivering said voltage wave thereto;

a series capacitor in said first lead; and

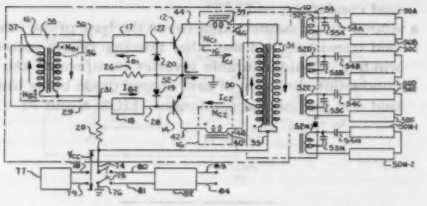
a second lead extending from said input means to said gate for delivering said voltage wave thereto in inverted relationship with the voltage wave supplied to said drain electrode through said series capacitor, the relative polarities of the voltages at said drain electrode and said gate reversing during successive alternations of said voltage wave whereby said transistor is cut off during every other alternation and conducts in the intervening alternations with resulting equalization of the voltages of said drain and source electrodes.

4,016,477

NOVEL MULTI-PATH LEAKAGE TRANSFORMER AND INVERTER BALLAST

Horace Ghiringhelli, Dumont, N.J., assignor to Isodyne Inc., Nanuet, N.Y.

Filed Apr. 29, 1975, Ser. No. 572,941
Int. Cl.² H02M *7/00*
U.S. Cl. 321—26 **15 Claims**



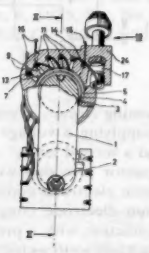
1. An inverter ballast for operating multiple electric gas discharge lamps, which comprises a power conversion circuit, and a leakage transformer having a multi-path magnetic circuit, said transformer including a primary coil operated from a single source and separate secondary coils, each said secondary coil having its own independent magnetic core circuit path and its own lamp loads.

4,016,478

HIGH-VOLTAGE TRANSFORMER

Herbert Anders; Antonius Adrianus Maria Bullens; Jan Groot; Johannes Henricus Bernardus Otten; Hendrikus Christiaan Josephus Stoof, and Carolus Leopoldus Vloemans, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 4, 1975, Ser. No. 610,447
Claims priority, application Netherlands, Sept. 5, 1974, 7411772
Int. Cl.² H02M *7/10;* **H01F** *27/04*
U.S. Cl. 321—27 R **5 Claims**



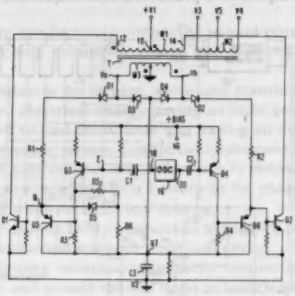
1. A high-voltage transformer comprising a ferromagnetic core, a primary winding disposed on said core, an insulating layer disposed on said winding, a secondary winding disposed on said layer, a component holder, a socket connector mounted on said holder for the output of the high-voltage to be generated, the secondary winding including a number of winding layers, insulating layers disposed between said layers, a plurality of diodes coupled between an end of the winding layer to a beginning of the subsequent winding layer respectively, all diodes being coupled in the same rectifying sense, the component holder being disposed on the secondary windings, support means being disposed on the component holders for clamping the diodes to prevent rotation about their axis, the connection wires of the diodes comprising connection pins for a part of the windings, and two tag means disposed on the component holder for clamping the connector.

4,016,479

HIGH FREQUENCY POWER CONVERTER DRIVE CIRCUIT

George A. Reible, Jr., Saugerties, and George D. Sevigny, Red Hook, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 28, 1975, Ser. No. 563,239
Int. Cl.² H02M *7/537*
U.S. Cl. 321—45 R **9 Claims**



1. In a push-pull switching circuit,

a pair of conduction control means each having a controlled conduction circuit and a control input terminal,

a source of input power,

push-pull inductive means connecting said conduction control means across said source for alternative operation of said inductive means in opposite senses as one and the other of said conduction means conduct in alternation,

feedback means coupled to said inductive means to bias the first of said conduction means into conduction when the second of said conduction means turns off and to continue such bias during the continuance of conduction of said first conduction means, and vice versa,

said feedback means including means connected to block operation thereof from communicating turn-off signals to either of said control terminals,

alternating input signal means,

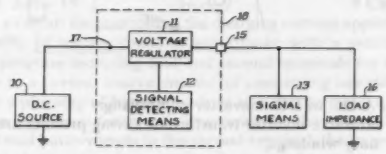
said coupling means adapted to communicate turn-off signals from said input signal means to said control terminals in alternation, whereby said circuit operates in push-pull oscillation at the frequency determined by said input signal means and under the power of said source.

4,016,480

DUAL FUNCTION COUPLING SYSTEM AND METHOD

Judson A. Hofmann, Schaumburg, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Mar. 4, 1974, Ser. No. 448,136
Int. Cl.² G08C *19/02;* **G05F** *3/08*
U.S. Cl. 323—8 **14 Claims**



11. In a signal processing system including an integrated circuit having a plurality of electronic circuit elements and a limited number of externally accessible terminals, said integrated circuit including voltage regulating means coupled to one of said terminals for maintaining a substantially constant voltage across a load impedance, the method of feeding an additional signal into said integrated circuit comprising:

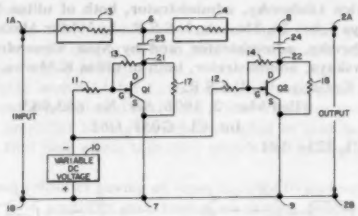
applying said signal to said one terminal and causing said voltage regulating means to make a compensating response to maintain said substantially constant load voltage; and

detecting the response of said voltage regulating means to said applied signal.

4,016,481
UNMATCHED FIELD EFFECT TRANSISTORS PROVIDING MATCHED VOLTAGE-CONTROLLED RESISTANCES

Stevan D. Bradley, East Palo Alto, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Nov. 26, 1975, Ser. No. 635,459
Int. Cl.² H03G 3/30; H04B 1/10
U.S. Cl. 323—16 **10 Claims**



1. Apparatus providing first and second voltage-controlled resistances between associated first and second pairs of nodes thereof which are matched over a range of control voltages, comprising:

first and second field effect transistors (FET's) having gate electrodes, having drain electrodes electrically connected to first nodes of associated first and second pairs of nodes, and having source electrodes electrically connected to second nodes of associated first and second pairs of nodes, each of said FET's having a drain-to-source channel resistance that is variable as a function of a voltage that is applied across one of the gate-to-source and gate-to-drain channels thereof;

a source of DC control voltage having first and second terminals;

means electrically connecting the first terminal of said voltage source to one of the source and drain electrodes of each of said FET's and electrically connecting the second terminal of said voltage source to the gate electrode of said first FET;

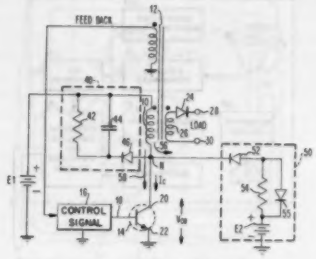
a first resistor electrically connected across the channel of said second FET gate electrode and the other one of the source and drain electrodes of said second FET; and

a second resistor electrically connected between the second terminal of said voltage source and the gate electrode of said second FET, said second resistor having a resistance causing the resistances across the first and second pairs of nodes to be the same value for a prescribed common control voltage measured across the terminals of said voltage source and causing the resistance across the second pair of nodes to be substantially equal to the resistance across the first pair of nodes over a range of control voltages.

4,016,482
PULSE ENERGY SUPPRESSION NETWORK

John Robert Cielo, Kingston, and John Andrew Orfitelli, New Paltz, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1975, Ser. No. 627,732
Int. Cl.² G05F 1/56; H03K 17/64
U.S. Cl. 323—17 **10 Claims**



1. In a switching circuit, a switch element having conducting and open circuit states,

potential means establishing current flow through said element when said element is in said conducting state,

and a clamp circuit adapted to restrain rise of potential across said switch during turnoff transition from said conducting state to said open circuit state,

said clamp comprising a diode connected in shunt across said element and poled oppositely to the direction of said current,

and bias means to establish forward current through said diode at least immediately prior to said transition, said bias means being adapted to accept recovery current from said diode as said diode is reverse biased by said potential means during said transition,

said diode having a reverse recovery time characteristic at least equal to a substantial part of said transition time whereby said diode acts as a timed clamp across said element during said transition.

4,016,483
MICROMINIATURE INTEGRATED CIRCUIT IMPEDANCE DEVICE INCLUDING WEIGHTED ELEMENTS AND CONTACTLESS SWITCHING MEANS FOR FIXING THE IMPEDANCE AT A PRESELECTED VALUE

Marvin B. Rudin, Suite R101, 555 Middlefield Road, Mount View, Calif. 94040

Continuation-in-part of Ser. No. 483,619, June 27, 1974, abandoned. This application June 9, 1975, Ser. No. 585,075
Int. Cl.² G05F 3/00
U.S. Cl. 323—74 **37 Claims**

1. A microminiature terminal-adjustable integrated circuit impedance device comprising:

an electrically insulating substrate;

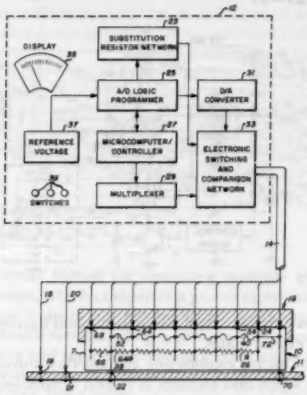
a first input terminal and an output terminal formed on said substrate;

a plurality of impedance elements formed on said substrate and coupled together in series between said input terminal and said output terminal;

a plurality of adjustment terminals formed on said substrate, each of said adjustment terminals being respectively connected to one side of different one of said impedance elements with each side of each impedance element having an adjustment terminal connected thereto;

a plurality of electrically permanently alterable contactless voltage-responsive circuit elements formed on said substrate with each corresponding to one of said impedance elements and being connected in parallel therewith and between adjacent ones of said adjustment terminals, said

plurality of voltage-responsive circuit elements connected as aforesaid in combination with said plurality of impedance elements causing the impedance between said input terminal and said output terminal to have a first predetermined value, each said voltage-responsive circuit element normally having a first electrical characteristic and having a second electrical characteristic different

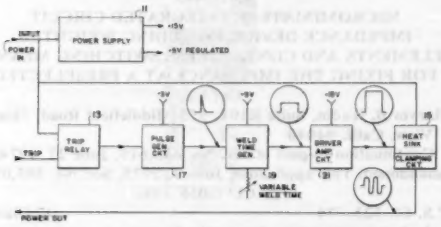


from said first electrical characteristic following the application thereacross of a predetermined voltage such that when said predetermined voltage is applied between any particular pair of said adjustment terminals, the connecting voltage-responsive circuit element is caused to assume said second electrical characteristics thereby changing the impedance between said input terminal and said output terminal to a second predetermined value.

4,016,484
SOLID STATE WELD TIMER

Reading H. Crouthamel, 742 High St., Bethlehem, Pa. 18018

Filed June 18, 1975, Ser. No. 587,873
Int. Cl.² G05F 1/56
U.S. Cl. 323—22 SC **9 Claims**



1. A power control circuit for supplying a fixed duration excitation across first and second output terminals from first and second input terminals supplied with a continuous A.C. signal comprising:

conductor means for connecting said first output terminal and said first input terminal;

means for generating a trigger pulse, said means-comprising:

a single pole terminal switchable between first and second throw terminals; said pole terminal normally being connected to said first throw terminal;

trip relay means for switching said pole between said first and second throw terminals;

a capacitor connected to said pole terminal;

a resistor connected between said first throw terminal and ground;

a voltage bias source connected to said second throw terminal; and

transistor circuit means having an output terminal and connected to said capacitor for generating an output pulse at said output terminal in response to connection of said capacitor to said bias source by said trip relay means;

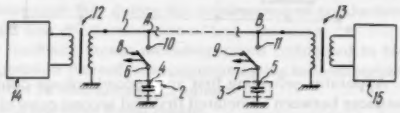
means for generating a rectangular waveform in response to generation of a said trigger pulse, said means including means for selectively setting the duration of said rectangular waveform; and

switching means connected between said second input terminal and said second output terminal for producing a full wave A.C. excitation across said first and second output terminals for the duration of a said rectangular waveform.

4,016,485
ARRANGEMENT FOR LIMITING DYNAMIC OVERVOLTAGES

German Ivanovich Samorodov, prospekt Dzerzhinskogo, 30/4, kv. 6; Evgeny Nikolaevich Loiko, ulitsa Relsovaya, 21, kv. 65, both of Novosibirsk, U.S.S.R.; Orest Viktorovich Olshevsky, deceased, late of Novosibirsk, U.S.S.R.; by Valentina Mikhailovna Olshevskaya, administrator; by Alexandr Orestovich Olshevsky, administrator, both of ulitsa Meschanskaya 1, kv. 26, Moscow, U.S.S.R.; by Viktor Alexandrovich Olshevsky, administrator, and by Nina Alexandrovna Olshevskaya, administrator, both of ulitsa K.Marxa, 137, kv. 18, Krasnoyarsk, U.S.S.R.

Filed Mar. 2, 1976, Ser. No. 663,083
Int. Cl.² G05F 1/68
U.S. Cl. 323—101 **1 Claim**



1. An arrangement for limiting dynamic overvoltages in a long-distance power transmission line of commerical frequency, interconnecting a transmitting power system and a receiving power system, comprising:

a. two batteries of static capacitors; the outputs respectively, of said batteries of static capacitors;

b. two switching devices adapted to connect, respectively, said two batteries of static capacitors to said long-distance commercial-frequency power transmission line the moment relative swinging of said transmitting power system and said receiving power system occurs;

c. the input of one of said two switching devices being connected to said output of one of said batteries of static capacitors;

d. the input of the other one of said two switching devices being connected to the output of the other one of said two batteries of static capacitors;

e. the output of said other switching device being connected to said long-distance commercial-frequency power transmission line at a point spaced from said transmitting power system by a distance of which the wavelength equals half the wavelength of the voltage of this commercial frequency;

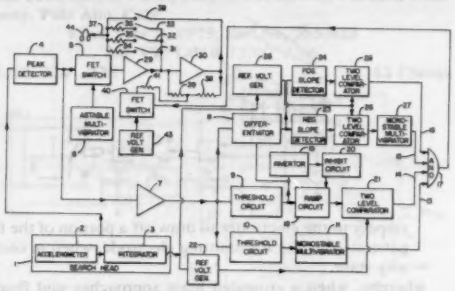
f. the output of said one switching device being connected to said long-distance commercial-frequency power transmission line at a point spaced from said receiving power system by a distance of which the wavelength equals half the wavelength of the voltage of this commercial frequency.

4,016,486

LAND MINE DETECTOR WITH PULSE SLOPE, WIDTH AND AMPLITUDE DETERMINATION CHANNELS

Peter M. Pecori, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 19, 1976, Ser. No. 659,453
Int. Cl.² G01V 3/08
U.S. Cl. 324—3 10 Claims



1. A land mine detector comprising:

a search head;

a peak detector having an input coupled to said search head for receiving signals from said search head and having an output;

a first field effect transistor switch having a first input coupled to said output of said peak detector and having a second input and an output;

an astable multivibrator having an output coupled to said second input of said first field effect transistor switch;

a first amplifier having an input coupled to said ouput of said first field effect transistor switch and having an output;

a second amplifier having an input coupled to said output of said first amplifier and having an output coupled to a means for converting said second amplifier output into a user perceivable form;

means coupled to said second amplifier for controlling the gain of said second amplifier and thereby controlling the output as perceived by the user;

a third amplifier having an input coupled to said output of said peak detector;

an AND gate having first, second, third, and fourth inputs and having output coupled to said means to control the gain of said second amplifier;

slope determination means having an input coupled to said output of said third amplifier and having a first output coupled to said fourth input of said AND gate and a second output coupled to said third input of said AND gate;

pulse width determining means having an input coupled to said output of said third amplifier and an output coupled to said second input of said AND gate; and

pulse amplitude determining means having an input coupled to said output of said third amplifier and an output coupled to said first input of said AND gate.

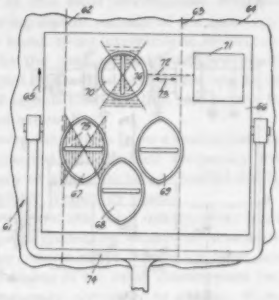
4,016,487

ARRANGEMENT OF EDDY CURRENT SCANNING COILS

Peter Neumaier, Reutlingen, Germany, assignor to Institut Dr. Friedrich Forster, Prufgeratebau, Reutlingen, Germany

Filed Mar. 8, 1976, Ser. No. 665,009
Claims priority, application Germany, Mar. 7, 1975, 2509927
Int. Cl.² G01R 33/12
U.S. Cl. 324—37 8 Claims

1. An arrangement of eddy current scanning coils for determining the presence of surface and near-surface defects in a metal part moving relatively thereto, each scanning coil including an exciter winding for producing eddy currents in the metal part and a receiver winding for receiving signals produced by defects, the exciter winding axis being substantially normal to the part surface being scanned and the receiver winding axis being perpendicular to the exciter winding axis, the improvement comprising:



the scanning coils being arranged in at least two groups, with the scanning coils of the groups being oriented to be effective for different angular ranges of defects; and

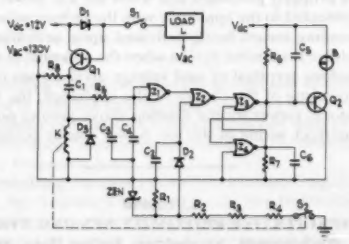
means provided for oscillating at least one scanning coil normally to the direction of relative movement between the scanning coils and metal part.

4,016,488

PULSING GROUND-TEST CIRCUIT

William M. Stevens, Loveland, Ohio, assignor to Hill-Rom Company, Inc., Batesville, Ind.

Filed Oct. 4, 1974, Ser. No. 512,078
Int. Cl.² G01R 31/02
U.S. Cl. 324—51 23 Claims



12. A ground-test device for an appliance energized by an alternating current power source, a hot wire of the appliance to be connected to the high voltage side of the power source and a common of the appliance to be connected to ground, comprising:

activation means to intermittently cause a ground connection from the hot wire to ground to be completed;

testing means responsive to current flow conditions in said ground connection;

responding means activated by said testing means if the common of the appliance is not properly grounded or if the polarity of the connections from the power source to the hot wire and the common of the appliance are incorrect; and

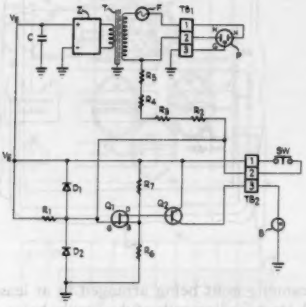
interrupting means to permit current flow through said ground connection only for a limited predetermined time.

4,016,489

GROUND-TEST CIRCUIT WITH MINIMAL GROUND CURRENT

James S. Adams, and Charles W. Cutler, both of Batesville, Ind., assignors to Hill-Rom Company, Inc., Batesville, Ind.

Filed Oct. 4, 1974, Ser. No. 512,313
Int. Cl.² G01R *31/02*
U.S. Cl. 324—51 **13 Claims**



1. A ground-test circuit for an appliance energized by an a.c. power source having the neutral thereof grounded, the chassis of the appliance to be connected to ground, comprising:

a d.c. power supply having a first side thereof connected to the chassis of the appliance, so that a second side thereof provides a d.c. test potential with respect to the chassis;

a voltage divider connected between said second side of said d.c. power supply and the neutral of the a.c. power source, said voltage divider having an intermediate terminal and a total resistance sufficiently great to limit the current flow therethrough to a desired level;

a voltage responsive device connected to said intermediate terminal of said voltage divider, the potential at said intermediate terminal being less than that required to activate said voltage responsive device, when the chassis of the appliance and the neutral of the a.c. power source are properly grounded and when the a.c. power source is connected to the appliance with the proper polarities; and

responding means being activated upon activation of said voltage responsive device when the potential at said intermediate terminal of said voltage divider rises due to ungrounding of the chassis of the appliance, the neutral of the a.c. power source floating above ground potential or incorrect wiring of the a.c. power source connections.

4,016,490

CAPACITATIVE PROXIMITY SENSING SYSTEM

Albert Weckenmann, Ahrensburg; Lothar Haas, Siegelsdorf, and Rolf Bräutigam, Nurnberg, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Dec. 3, 1975, Ser. No. 637,181
Claims priority, application Germany, Dec. 19, 1974, 2460057
Int. Cl.² G01R *27/26*
U.S. Cl. 324—61 R **8 Claims**

1. Capacitative proximity sensing system comprising

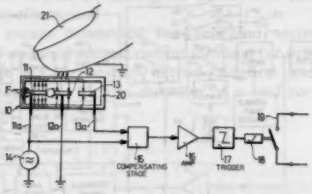
a leakage field capacitor having a support and two adjacently located planar surface electrodes (**11, 13, 31, 32**) located on the surface of the support;

a signal source (**14**) having one terminal connected to one of the electrodes (**11, 31**) whereby said one electrode will be a transmitting electrode;

a receiving and evaluation circuit (**15–18; 35, 36–42**) having one terminal connected to the other electrode (**13, 32**) whereby said other electrode will be a receiving electrode, said receiving and evaluation circuit evaluating disturbances of the field being emitted by the transmitting electrode;

the other terminal of said signal source being connected to a common ground or chassis connection;

and an electrically floating metallic shield (**20, 33**) galvanically insulated from said electrodes and from said ground or chassis connection, said shield being located with



respect to the electrodes to draw off a portion of the field generated by the transmitting electrode, when in oscillatory state,

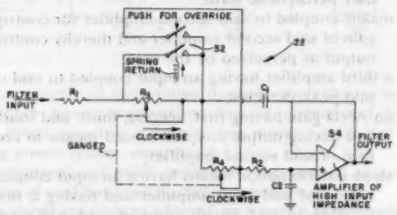
whereby, when a grounded mass approaches said floating shield, the leakage field drawn off by said shield will increase and thus provide a signal at the receiving electrode sensing proximity of the mass, said signal being evaluated in the evaluation circuit.

4,016,491

SINGLE KNOB ROTARY CONTROL OF METER DAMPING AND PUSH CONTROL OF DAMPING OVERRIDE

James H. Macemon, Glen Burnie, and Charles I. Soodak, Silver Spring, both of Md., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Apr. 22, 1976, Ser. No. 679,443
Int. Cl.² G01R *1/38, 1/02*
U.S. Cl. 324—128 **10 Claims**



1. In combination:

a source of noisy signal having a significant direct current component and a non-significant alternating current component;

said alternating current component having frequencies and amplitudes which, over a small period of time, are relatively constant, but which will greatly vary at different times;

adjustable means for removing a selected portion of said alternating current components from said noisy signal to produce a smoothed signal having all of the significant direct current component and a lesser amount of said non-significant alternating component than said noisy signal;

means to display the value of said smoothed signal;

said adjustable means including a manual control having dual motions;

means under the control of one of said dual motions to variably control the amount of alternating current components removed by said adjustable means in accordance with the amount of said one motion;

means under the control of the other of said dual motions to override the means under the control of one of said dual

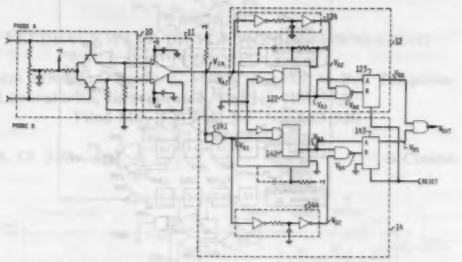
motions and to control said adjustable means for removing to remove a predetermined amount of said alternating current components.

4,016,492

PULSE DISCRIMINATOR AND MISPROBE DETECTOR FOR DIGITAL LOGIC TESTER PROBE

Edward C. Miller, Jr., Saratoga, and William J. Haydamack, San Jose, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed June 9, 1975, Ser. No. 585,423
Int. Cl.² G01R *15/00, 1/06*
U.S. Cl. 324—128 **12 Claims**



1. A logic circuit tester probe system comprising:

a high input impedance probe for making contact with a logic circuit node under test and producing in-phase signals in response to pulses at that node, said pulses having positive- and negative-going leading edges;

impedance matching means coupled to the probe for receiving electrical signals therefrom;

first means coupled to the impedance matching means for producing first signals in response to pulses having positive-going leading edges when the duration of the pulse is greater than a preselected value, and for producing first standby signals in response to pulses having negative-going leading edges;

second means coupled to the impedance matching means for producing second signals in response to pulses having negative-going leading edges when the duration of the pulse is greater than the preselected value, and for producing second standby signals in response to pulses having positive-going leading edges; and

output means coupled to the first and second means for rejecting pulses detected at the node having a duration less than the preselected value in response to the combination of the first signals and second standby signals or the second signals and the first standby signals.

4,016,493

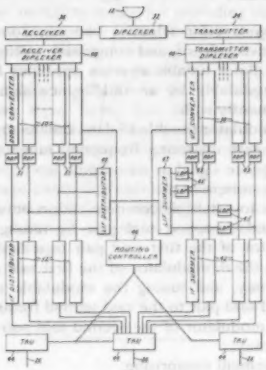
SIMPLIFIED LAND LINE AND SATELLITE COMMUNICATION SWITCHING SYSTEM

William B. Gross, Havertown, Pa., assignor to General Electric Company, Fairfield, Conn.

Filed Oct. 22, 1975, Ser. No. 624,955
Int. Cl.² H04B *1/50, 7/185, 7/24;* **H04J** *1/10*
U.S. Cl. 325—4 **4 Claims**

1. The method of switching a plurality of access lines to each other and to satellite relay channels which comprises in combination:

1. converting the signals from a first said access line to a first selected intermediate frequency lower than the frequency of a satellite relay channel and lying in a relay intermediate frequency band;
2. connecting the said first intermediate frequency signals, by frequency-selective means for transmitting signals in the relay intermediate frequency band and attenuating signals outside of the relay intermediate frequency band, to a frequency converter to change them to a first satellite relay channel frequency for relay by the satellite and
3. converting the signals from the first said access line to a second selected intermediate frequency lower than the frequency of a satellite relay channel and lying in a local intermediate frequency band outside of the relay intermediate frequency band;
4. transmitting the said second intermediate frequency signals, by frequency-selective means for transmitting signals in the local intermediate frequency band and attenuating signals outside of the local intermediate frequency band, to an intermediate frequency demodulator tuned to the said second intermediate frequency and connected to a second said access line for transmission of the said signals from the first said access line to the second said access line;
5. converting the signals from a second said access line to a third selected intermediate frequency lower than the frequency of a satellite relay channel and lying in a relay intermediate frequency band;
6. connecting the said third intermediate frequency signals, by frequency-selective means for transmitting signals in the relay intermediate frequency band and attenuating signals outside of the relay intermediate frequency band, to a frequency converter to change them to a second satellite relay channel frequency for relay by the satellite and



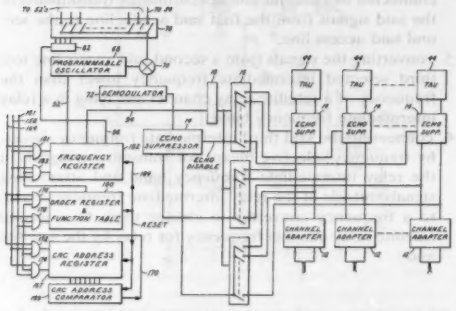
7. converting the signals from the second said access line to a fourth selected intermediate frequency lower than the frequency of a satellite relay channel and lying in a local intermediate frequency band outside of the relay intermediate frequency band;
8. transmitting the said fourth intermediate frequency signals, by frequency-selective means for transmitting signals in the local intermediate frequency band and attenuating signals outside of the local intermediate frequency band, to an intermediate frequency demodulator tuned to the said fourth intermediate frequency and connected to the first said access line for the transmission of the said signals from the second said access line to the first said access line;
9. converting signals at a satellite relay channel frequency to intermediate frequency signals in the relay intermediate frequency band and transmitting the said intermediate frequency signals to an intermediate frequency demodulator tuned to the said signals and connected to the said first access line for transmission of the said signals, after demodulation, to the said first access line; and
10. converting signals at a satellite relay channel frequency to intermediate frequency signals in the relay intermediate frequency band and transmitting the said intermediate frequency signals to an intermediate frequency demodulator tuned to the said signals and connected to the said

second access line for transmission of the said signals, after demodulation, to the said second access line.

4,016,494
SATELLITE COMMUNICATION SYSTEM WITH IMPROVED CONFERENCE FACILITY

Edward W. Moll, Norristown, Pa., assignor to General Electric Company, Fairfield, Conn.

Filed Nov. 11, 1975, Ser. No. 630,773
Int. Cl.² H04B 7/00
U.S. Cl. 325—15 **2 Claims**



1. In a system for selective two-way communication between any two pairs of, and comprising a plurality of pairs of:

a. an oscillator tunable over an operating frequency range and modulable by an intelligence signal input paired permanently with

b. a demodulator tunable to demodulate a modulated signal in the said operating frequency range and produce an intelligence signal as on output;

and further comprising:

c. means to establish communication between a first said pair and a second said pair by tuning the modulable oscillator of the first said pair to a first frequency and tuning the demodulator of the first said pair to a second frequency, and tuning the modulable oscillator of the second said pair to the said second frequency and tuning the demodulator of the second said pair to the said first frequency;

the improvement comprising:

d. at least three independent demodulators tunable to demodulate a modulated signal in the said operating frequency range and produce an intelligence signal as an output;

e. means to connect the intelligence signal output of each independent demodulator to the intelligence signal output of a paired demodulator;

f. means to tune each independent demodulator to demodulate a modulated signal at a third frequency different from the said first and second frequencies to which are tuned the modulable oscillator and the demodulator of the pair to whose intelligence signal output the intelligence signal output of the independent demodulator is connected as recited in e);

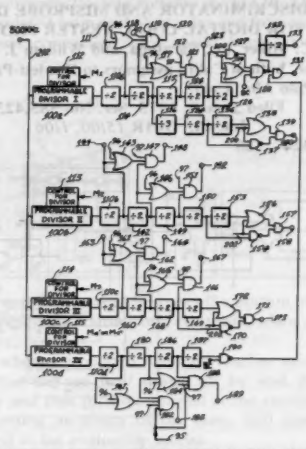
whereby communication may be established directly among any of the pairs without relaying through any other pair.

4,016,495
ELECTRONIC MUSICAL INSTRUMENT USING PLURAL PROGRAMMABLE DIVIDER CIRCUITS

William V. Machanian, Lewiston, N.Y., assignor to The Wurlitzer Company, Chicago, Ill.

Division of Ser. No. 475,449, June 3, 1974, abandoned. This application July 10, 1975, Ser. No. 594,743
Int. Cl.² H03K 3/84; G10H 5/00
U.S. Cl. 328—18 **6 Claims**

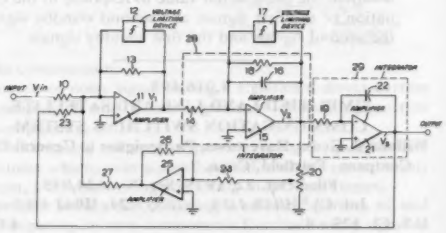
1. A tone signal generator for electronic musical instruments comprising a plurality of programmable divisor circuits each capable of dividing a given frequency input signal by a plurality of different divisors to produce a base frequency signal and a plurality of sub-harmonics thereof, input circuit means for applying a given frequency signal to each of said programmable divisor circuits, output circuits means for receiving selected one of a said plurality of different frequency signals produced by said programmable divisor circuits and control circuit means connected to said programmable divisor circuit including selector means selectively to maintain and change the divisor factors of said programmable divisor circuits.



4,016,496
METHOD AND APPARATUS FOR PRODUCING RAMP SIGNALS WITH ROUNDED INFLECTION POINTS

Peter deHertel Eastcott, Peterborough, Canada, assignor to Canadian General Electric Company Limited, Toronto, Canada

Filed Sept. 19, 1975, Ser. No. 615,054
Claims priority, application Canada, Dec. 16, 1974, 216282
Int. Cl.² H03K 5/08; G06G 7/18
U.S. Cl. 328—35 **11 Claims**



1. A circuit for producing an electric output signal having a waveshape the first derivative of which approximates a trapezoid, said circuit comprising:

a. switching means selectively operable to provide a first signal which varies between a zero value, and relatively positive and negative values;

b. a first integrator responsive to said first signal to provide a second signal;

c. means to limit the magnitude of said second signal; and,

d. a second integrator responsive to said second signal to provide said electric output signal.

11. The method of producing an electrical signal having a

waveshape the first derivative of which approximates a trapezoid, said method comprising:

a. selectively providing an input signal of generally stepped voltage waveshape, which varies between a zero value and relatively positive and negative values, to a first integrator having a voltage limited output;

b. feeding the output of said first integrator into a second integrator which outputs said electrical signal; and,

c. utilizing the output of said second integrator in a feedback mode to determine which of a positive step voltage, a negative step voltage and a zero voltage should be applied to the input of said first integrator.

4,016,497

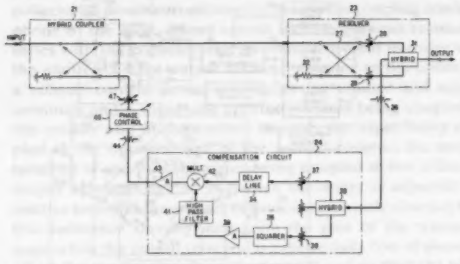
FEEDBACKWARD DISTORTION COMPENSATING CIRCUIT

Hotze Miedema, Boxford, Mass., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 5, 1976, Ser. No. 683,320

Int. Cl.² H04B *1/62*

U.S. Cl. 328—162 **6 Claims**



1. A distortion compensating circuit for a signal path subject to distortion comprising:

means, connected to the output of said compensating circuit, for extracting a portion of the signal in said signal path;

means, operating on said extracted signal portion, for producing a third order output signal therefrom;

means for adjustably controlling the phase and amplitude of said third order output signal to provide a compensating signal having an opposing phase relationship with and an amplitude substantially equal to third order distortion effects present in said signal path; and

means, connected to the input of said compensating circuit, for coupling the compensating signal to said signal path to substantially eliminate said third order distortion effects from said signal path.

4,016,498

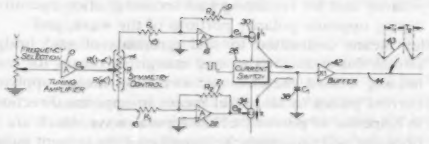
VARIABLE DUTY CYCLE WAVEFORM GENERATOR

LeMoyne F. Hadley, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sept. 25, 1975, Ser. No. 616,725

Int. Cl.² H03K *4/10, 5/04*

U.S. Cl. 328—181 **1 Claim**



1. A waveform generator circuit comprising:

means for energy storage;

switching means coupled to the means for energy storage for alternately switching a first and a second electrical current to the means for energy storage;

tuning means for producing a first electrical signal, said first electrical signal representing a selected frequency;

dividing means coupled to the tuning means for dividing said first electrical signal into a first component and a second component; and

means coupled to the dividing means for providing the first and second electrical currents in response to said first and second components of said first electrical signal, and for maintaining a constant value for the sum of the reciprocal values of said first and second control signals irrespective of the relative value of said first and second components of said first electrical signal, the sum of the reciprocal values of said first and second control signals being dependent on said first electrical signal;

said means for providing the first and second control signals comprising:

a first amplifier having inverting and non-inverting inputs and a feedback path through a first feedback impedance to the inverting input, for receiving the first component of said first electrical signal at the inverting input, said non-inverting input being tied to a first reference voltage, said first amplifier providing a first DC control voltage in response to the first component of the first electrical signal;

a first DC controlled current source coupled to said amplifier and said switching means for providing the first electrical current in response to the first DC control voltage;

a second amplifier, having inverting and non-inverting inputs and a feedback path from the output through a second feedback impedance to the inverting input, said non-inverting input being tied to a second reference voltage said second amplifier providing a second DC control voltage in response to the second component of said first electrical signal; and

a second voltage controlled current source coupled to said second amplifier and said switching means for providing the second electrical current in response to said second DC control voltage.

4,016,499

CHARGED PARTICLE ACCELERATOR

Gersh Itskovich Budker, ulitsa Maltseva, 6; Vasily Alexandrovich Gaponov, ulitsa Zolotodolinskaya, 9, kv. 27; Boris Mikhailovich Korabelnikov, ulitsa Geroev Truda, 23, kv. 37; Gennady Sergeevich Krainov, ulitsa Tereshkovoi, 40, kv. 32; Sergei Alexandrovich Kuznetsov, ulitsa Lyapidevskogo, 22; Nikolai Konstantinovich Kuksanov, Morskoi prospekt, 15, kv. 9; Vasily Ivanovich Kondratiev, ulitsa Pervomaiskaya, 162, kv. 5, and Rustam Abelevich Salimov, Morskoi prospekt, 7, kv. 6, all of Novosibirsk, U.S.S.R.

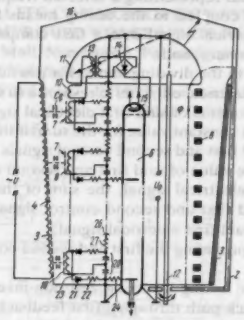
Filed July 17, 1975, Ser. No. 596,750

Int. Cl.² H01J *23/00*

U.S. Cl. 328—233 **4 Claims**

1. A charged particle accelerator comprising: a high-voltage generator built around a transformer; a magnetic circuit of said transformer, which magnetic circuit is sleeve-shaped; a primary winding of said transformer, arranged coaxially with and inside said magnetic circuit; a secondary, sectional winding of said transformer, arranged coaxially with said primary winding and inside said primary winding; coils making up said secondary winding; a high-voltage electrode of said secondary winding; an accelerator tube connected to said high-voltage electrode and arranged in the space enveloped by said secondary winding, coaxially with said secondary winding; a plurality of diode-capacitor rectifier circuits interconnected in se-

ries and arranged in the space between said accelerator tube and said secondary winding; each of said diode-capacitor



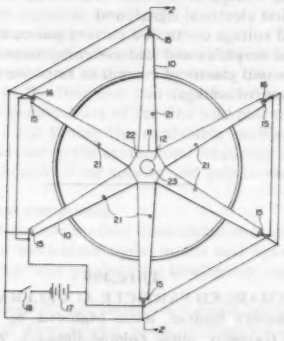
rectifier circuits being connected to one of said coils of the secondary winding.

4,016,500

EXPLOSIVELY DRIVEN LASER AMPLIFIER SYSTEM

Herschel S. Pilloff, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 17, 1975, Ser. No. 623,278
Int. Cl.² H01S *3/091, 3/20*
U.S. Cl. 330—4.3 **3 Claims**



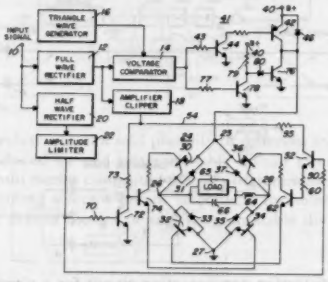
1. An explosively excited laser amplifier which comprises:
a housing formed of radiation-transparent material in the shape of a hexahedron;
a fluid-type laser amplifier cell supported coaxially within said housing;
a radiation-absorbing fluid within said housing and surrounding said fluid-laser amplifier cell for absorbing visible and infrared radiation of wavelengths which are not effective in pumping said amplifier due to heating of fluid in said laser amplifier cell;
a plurality of equally spaced, radially extending, pyramidally shaped, laser excitation lamps, each secured at its base end to one side of said hexagonal-shaped housing with the length and width of its base equal that of the length and width of the face of said housing to which it is secured,
each of said pyramidal-shaped lamps having its apex end cut off and enclosed by an outer end surface;
a liner of explosive material on the inner surface of the apex end of each of said radially extending, laser excitation lamps;
a noble gaseous medium filling the volume of each of said pyramidal-shaped, laser excitation lamps between said housing and said liner of explosive material on the inner surface of the outer end thereof; and
means for simultaneously detonating said liner of explosive material in each of said laser lamps.

4,016,501

SWITCHING AMPLIFIER SYSTEM

Leon Jasinski, Fort Lauderdale, and Francis Robert Steel, Parkland, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 29, 1975, Ser. No. 644,484
Int. Cl.² H03F *3/38*
U.S. Cl. 330—10 **7 Claims**

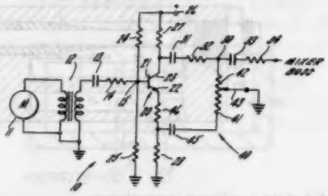


1. A switching amplifier for amplifying a bipolar wave to provide a high power output, including in combination,
pulse width modulation means for receiving the bipolar wave and for producing a single train of unipolar pulses having a constant repetition rate which is substantially greater than the highest frequency of the bipolar wave, said pulses of said train each having a duty cycle proportional to the instantaneous amplitude of the bipolar wave,
a bridge circuit having four terminals and four semiconductor switching means connecting said terminals, each of said switching means having a control terminal for rendering the same conductive,
energizing means coupled to said modulation means and to said bridge circuit for connecting supply means of a single polarity across diagonal terminals of said bridge circuit for the duration of each pulse produced by said modulation means,
control means having a first portion connected to said control terminals of a first opposite pair of said switching means for rendering the same conductive and a second portion connected to said control terminals of the other two of said switching means for rendering the same conductive, said control means including sensing means responsive to the bipolar wave for rendering said first portion operative during portions of the wave of one polarity and for rendering said second portion operative during opposite polarity portions of the wave, and
filter means connected to said terminals of said bridge circuit not connected to said energizing means for connecting a load thereto, said switching means applying current pulses to said filter means in opposite directions in response to portions of the bipolar wave which are of opposite polarities with the duration of the current pulses applied to said filter means varying with the amplitude of the bipolar wave, said filter means reducing fluctuations in the voltage applied to the load resulting from the switching action.

4,016,502
DYNAMIC RANGE EXTENDER CIRCUIT FOR PREAMPLIFIER

Harro K. Heinz, Deerfield, and Bernard S. Cahill, Mount Prospect, both of Ill., assignors to Rauland-Borg Corporation, Chicago, Ill.

Filed June 18, 1976, Ser. No. 697,441
Int. Cl.² H03G *3/30*
U.S. Cl. 330—29 **10 Claims**

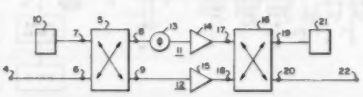


1. In an input amplifier stage for a microphone, the combination comprising a transistor having a base, emitter and collector, a direct current source, means for coupling a microphone to the base, a load circuit including a load resistor in series with the collector and an emitter resistor in series with the emitter, a stage output terminal coupled to the collector, a volume control potentiometer having emitter and output terminals and a wiper, the emitter terminal being coupled to the emitter end of the emitter resistor, the wiper being coupled to the opposite end of the emitter resistor, the output terminal of the potentiometer being coupled to the collector output terminal so that (a) when the wiper is adjacent the emitter terminal the emitter resistor is effectively shunted by a low resistance thereby increasing the gain of the transistor stage while the output terminal is substantially free of shunting effect for maximizing the output signal and so that (b) when the wiper is adjacent the potentiometer output terminal the stage output terminal is effectively shunted by a low resistance and the emitter resistor is substantially free of shunting effect for decreasing the gain of the transistor stage and minimizing the output signal, and a capacitor in the circuit which includes the emitter terminal and wiper so direct emitter current is prevented from flowing through the wiper.

4,016,503
HIGH-RELIABILITY POWER AMPLIFIER

Sheldon I. Rambo, Baltimore, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 24, 1975, Ser. No. 598,617
Int. Cl.² H03F *3/68*
U.S. Cl. 330—124 D **5 Claims**



5. A power amplifier comprising:

a hybrid junction having a pair of input ports and an output port,

a first amplifying channel connected to one of said input ports operative to generate an input signal of a first amplitude to govern the input signal to one input port to cause said junction to conduct at its output port an output signal of a second amplitude at times when only the input signal of said first channel is applied to the hybrid junction,

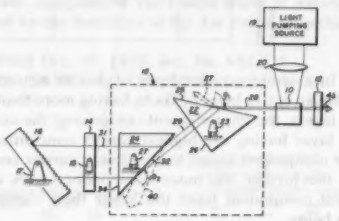
a second amplifying channel connected to the other of said input ports operative to generate an input signal having an amplitude substantially equal to the first amplitude to govern the input signal to the other input port to cause said junction to conduct at its output port an output signal of said second amplitude at times when only the input signal of the second channel is applied to the hybrid junction; and

means to shift the phase of the input signal of one of said channels relative to the input signal of the other of said channels an amount sufficient to govern the input signals to the input ports to cause said junction to conduct at its output port an output signal of substantially said second amplitude at times when the input signals of both the amplifying channels are present.

4,016,504
OPTICAL BEAM EXPANDER FOR DYE LASER

Gary K. Klauminzer, Palo Alto, Calif., assignor to Molectron Corporation, Sunnyvale, Calif.

Filed Apr. 12, 1976, Ser. No. 676,233
Int. Cl.² H01S *3/08*
U.S. Cl. 331—94.5 C **14 Claims**



1. In a dye laser apparatus including a pair of spaced apart reflectors defining an optical cavity having a dye cell and a beam expander disposed within said cavity, and a light pumping source for optically exciting the dye to a lasing condition, an improved beam expander comprising:

a first prism having a first input surface aligned with the optical axis of the dye cell and inclined at an incidence angle of θ_1 relative thereto, and a first output surface angularly related to said first input surface such that lies nearly orthogonal to light refracted from a laser beam directed along said optical axis; and

a second prism having a second input surface lying along the line of said refracted light and oriented at an incidence angle of θ_2 relative thereto, and a second output surface angularly related to said second input surface such that lies nearly orthogonal to light refracted from the beam of refracted light incident on said second input surface, whereby the width of the beam of light refracted from said second input surface is expanded relative to the beam incident on the first input surface in the plane of refraction by a factor of $M_1 \times M_2$ where

$$M_1 = \left[\frac{1-(\sin^2\Theta_1)/n_1^2}{1-\sin^2\Theta_1}\right]^{1/2}$$

and

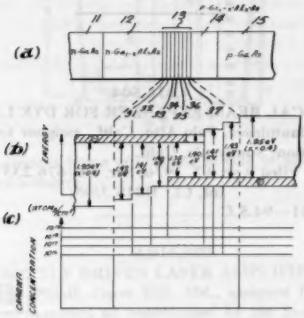
$$M_2 = \left[\frac{1-(\sin^2\Theta_2)/n_2^2}{1-\sin^2\Theta_2}\right]^{1/2}$$

and where n_1 and n_2 are respectively the refractive indexes of said first and second prisms.

4,016,505
DOUBLE HETEROSTRUCTURE SEMICONDUCTOR LASER

Kunio Itoh, and Morio Inoue, both of Takatsuki, Japan, assignors to Matsushita Electronics Corporation, Oaza-Kadoma, Japan

Continuation-in-part of Ser. No. 453,150, March 20, 1974, abandoned. This application Aug. 28, 1975, Ser. No. 608,714
Claims priority, application Japan, Mar. 20, 1973, 47-32362; Mar. 20, 1973, 47-32363
Int. Cl.² H01S 3/19
U.S. Cl. 331—94.5 H 2 Claims

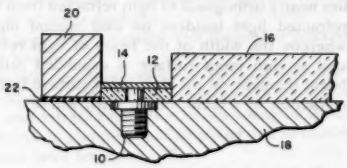


1. In a semiconductor laser of double heterostructure including an active layer of GaAs having more than two component layers, the improvement comprising: the central component layer having the highest carrier concentration and the outer component layers having lower carrier concentrations, with the further the outer component layers are from the central component layer the lower their carrier concentrations being.

4,016,506
DIELECTRIC WAVEGUIDE OSCILLATOR

J. Stephen Kofol, Roseville, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 24, 1975, Ser. No. 644,245
Int. Cl.² H03B 7/14, 9/12
U.S. Cl. 331—96 20 Claims

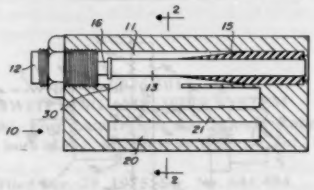


1. A microwave device comprising:
microwave producing means;
strip resonator means electrically connected to the microwave producing means and having first and second ends and wherein the strip resonator means has a length of approximately λ/2, wherein λ is the wavelength of microwaves produced by the microwave producing means; and
dielectric waveguide means having one end substantially in contact with the first end of the strip resonator means.

4,016,507
SOLID STATE MICROWAVE OSCILLATOR USING COUPLED TEM TRANSMISSION LINES

Richard Calvin Havens, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed May 11, 1976, Ser. No. 685,225
Int. Cl.² H03B 7/14, 9/12
U.S. Cl. 331—96 9 Claims

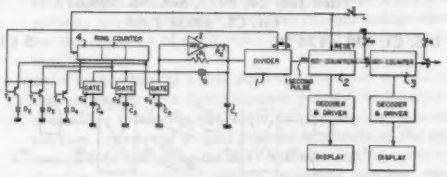


1. A solid state oscillator comprising:
a. a TEM transmission line;
b. a negative impedance semiconductor device connected at one end of said TEM transmission line for generating oscillations;
c. a lossy impedance connected to the other end of said TEM transmission line;
d. a TEM resonant transmission line with means for removing RF power therefrom; and
e. coupling means for coupling energy at a desired oscillation frequency from said TEM transmission line to said TEM resonant transmission line with the Q of the oscillator being determined by the amount of coupling.

4,016,508
ELECTRONIC TIMEPIECE HAVING PLURAL CAPACITORS FOR SELECTIVELY ADJUSTING QUARTZ CRYSTAL OSCILLATOR OUTPUT FREQUENCY

Takenobu Kobori, Kawasaki, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Aug. 14, 1975, Ser. No. 604,779
Claims priority, application Japan, Aug. 23, 1974, 49-101018[U]
Int. Cl.² H03B 3/04, 5/36
U.S. Cl. 331—116 R 8 Claims



1. In an electronic timepiece: a quartz-crystal oscillator for generating a high frequency output signal; a divider connected to said quartz-crystal oscillator for receiving therefrom the high frequency output signal and dividing it to a lower frequency output signal suitable as a time base; and means for selectively adjusting the frequency of said quartz-crystal oscillator high frequency output signal comprising a plurality of capacitors each having a preselected capacitance value, and means including a manually actuatable switch for selectively electrically connecting predetermined ones of said capacitors to said quartz-crystal oscillator in accordance with the number of actuations of said switch to accordingly selectively adjust the frequency of said quartz-crystal oscillator output signal.

4,016,509

WAVEGUIDE CIRCULATORS

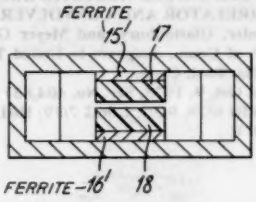
Joseph Helszajn, Edinburgh, Scotland, assignor to National Research Development Corporation, London, England

Filed Oct. 31, 1975, Ser. No. 627,786

Claims priority, application United Kingdom, Nov. 6, 1974, 48031/74

Int. Cl.² H01P *1/38*

U.S. Cl. 333—1.1 **16 Claims**



1. A three-port microwave junction circulation for use with a waveguide, including a junction member defining three ports, a gyromagnetic element within the junction member and having one surface only in electrical contact therewith, means for applying a magnetic field to traverse the gyromagnetic element in a predetermined direction, and at least one dielectric element aligned with the gyromagnetic element in the said direction, the overall dimension in the said direction of the gyromagnetic and dielectric elements taken together being substantially equal to an odd number of quarters of a wavelength, for propagation in the gyromagnetic and dielectric elements, at the centre frequency of a working range of frequencies of the circulator.

4,016,510

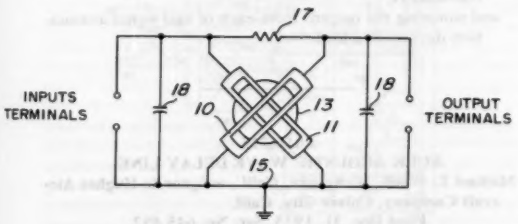
BROADBAND TWO-PORT ISOLATOR

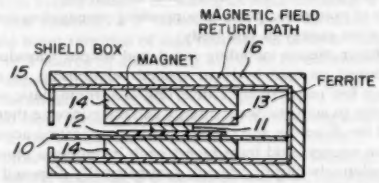
Eugene Walton Hodges, III, Sunrise; Francis Robert Steel, Parkland, and Ralph Thomas Enderby, Coral Springs, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 3, 1976, Ser. No. 682,686

Int. Cl.² H01P *1/36*

U.S. Cl. 333—24.2 **9 Claims**





1. A broadband two-port isolator especially suited for used with high frequency radio frequency apparatus, the isolator having input and output terminals and comprising in combination:

a reference voltage source;

a first conductor means connected between the input terminal and the voltage reference source;

a second conductor means connected between the output terminal and the voltage reference source, and further having its longitudinal axis at substantially 90° to the axis of the first conductor;

means for insulating the first conductor from the second conductor;

at least one gyromagnetic element positioned in close proximity to the conductors;

magnetic means for providing a static magnetic field, the first and second conductors and the at least one gyromagnetic element being positioned inside said magnetic field and the field being normal to the plane of the at least one gyromagnetic element;

first and second capacitors each connected in parallel with a respective one of said first and second conductor means; and

resistive means connected between the input and output terminals.

4,016,511

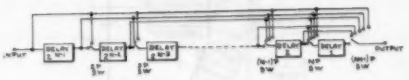
PROGRAMMABLE VARIABLE LENGTH HIGH SPEED DIGITAL DELAY LINE

John L. Ramsey, Concord, and Allen E. Post, Framingham, both of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 19, 1975, Ser. No. 642,521

Int. Cl.² H03H *7/30, 7/36;* **H03K** *5/153, 5/159*

U.S. Cl. 333—29 **6 Claims**



1. A variable length, high speed, digital delay line apparatus comprising in combination:

a set of serially arranged, fixed-length, digital delay units, and

a set of switching units interposed respectively between each of said set of delay units, said set of switching units having a set of switching position, said set of switching positions being one greater than the rank of the switching unit position within the delay unit chain, each switching position of said set of switching units being connected to a switching position within a switching unit of greater rank, each of said set of switching units being respectively selectable.

4,016,512

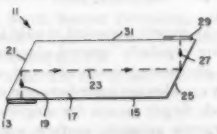
WIDE BAND BULK ACOUSTIC WAVE DELAY LINE

Michael T. Wauk, II, Agoura, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 2, 1975, Ser. No. 619,096

Int. Cl.² H03H *9/30;* **H01L** *41/10, 41/18*

U.S. Cl. 333—30 R **18 Claims**



1. A wide band bulk acoustic wave delay line, comprising:

a body of material capable of supporting propagating longitudinal and shear wave modes of acoustic energy, said body including at least one longitudinal-shear wave mode

converting wall defining a relatively long but relatively low-attenuation per unit time shear wave mode propagation path within said body angularly disposed with respect to the plane of said mode converting wall;

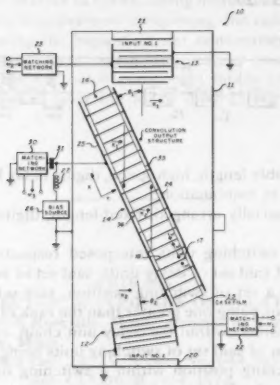
transducer means disposed on said body for converting electromagnetic wave energy to acoustic wave energy and the converse thereof, and for directing and receiving propagating longitudinal wave mode acoustic energy to and from said mode converting wall along relatively short but relatively higher attenuation per unit time longitudinal wave mode propagation paths within said body angularly disposed with respect to said plane of said mode converting wall and to said shear wave mode propagation path, the attenuation of said propagating acoustic wave energy in said body being relatively frequency dependent; and

mode conversion disturbance means in said mode propagation paths and associated with said mode converting wall for relatively frequency-independently increasing the attenuation of said propagating acoustic wave energy at said mode converting wall.

4,016,513
SURFACE WAVE CONVOLVER APPARATUS

Leland P. Solie, Acton, Mass., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Dec. 4, 1975, Ser. No. 637,542
Int. Cl.² H03H *9/26, 9/30;* **G06G** *7/19;* **H03F** *7/00*
U.S. Cl. 333—30 R **22 Claims**



1. A signal convolver including a body having an active surface means with piezoelectric properties for propagating first and second acoustic surface waves introduced at opposite ends thereof, comprising:

layer means having semiconductor properties and disposed on said active surface means for forming an interaction region therewith wherein first and second refracted acoustic surface waves are introduced therein in response to the propagation of said first and second acoustic surface waves,

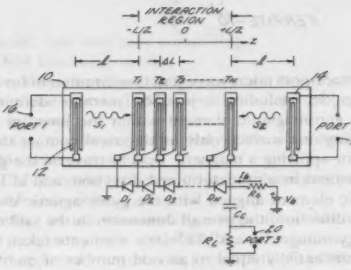
conductive array means disposed in said interaction region and including regularly spaced electrode finger means supporting alternating unidirectional electric fields of substantially equal magnitude between successive pairs of said electrode finger means for amplifying said first and second refracted acoustic surface waves, and wherein said electrode finger means are uniformly situated at an angle, other than 90°, with respect to the directions of propagation of said first and second acoustic surface waves, and

summing means coupled to said conductive array means for sensing a sum frequency signal equal to the sum of the frequencies of said first and second refracted acoustic surface waves.

4,016,514
DIODE COUPLED TAPPED ACOUSTIC DELAY LINE CORRELATOR AND CONVOLVER

Thomas M. Reeder, Glastonbury, and Meyer Gilden, West Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 9, 1973, Ser. No. 404,831
Int. Cl.² H03H *9/26, 9/30;* **G06G** *7/19;* **H01L** *9/04*
U.S. Cl. 333—30 R **19 Claims**



11. A method for processing two electrical signals comprising the steps of

generating in a piezoelectric delay line first and second contra-flowing surface acoustic waves responsive respectively to first and second modulation waveforms,

positioning in the path of both said acoustic waves a plurality of transducers, each said transducer producing a voltage in response to the coincidence of both said acoustic waves,

applying each of said voltages to an independent nonlinear signal attenuation device connected with each of said transducers,

and summing the outputs from each of said signal attenuation devices in a load.

4,016,515
BULK ACOUSTIC WAVE DELAY LINE

Michael T. Wauk, II, Agoura, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

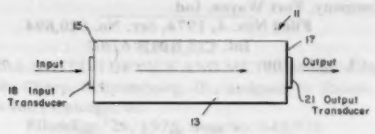
Filed Dec. 31, 1975, Ser. No. 645,492
Int. Cl.² H03H *9/04, 9/30;* **H01L** *41/10;* **H04R** *23/00*
U.S. Cl. 333—30 R **9 Claims**

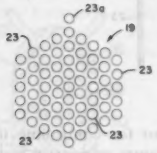
1. A bulk acoustic wave delay line, comprising:

a body of material capable of supporting propagating acoustic wave energy in said body;

transducer means including input and output transducers disposed on said body in spaced relationship to each other for respectively converting electromagnetic wave energy to acoustic wave energy and the converse thereof, and for directing and receiving said propagating acoustic wave energy, said transducers each including a plurality of relatively closely spaced, symmetrically disposed and evenly dispersed conductive electrodes defining respectively first and second top-electrode array patterns, each of said array patterns defining an axis of symmetry, said second pattern being oriented to have its axis of symmetry at a predetermined offset angle with respect to said

axis of symmetry of said first pattern causing propagating acoustic wave energy from at least one of said electrodes





in said first pattern to be intercepted by at least one of said electrodes in said second pattern.

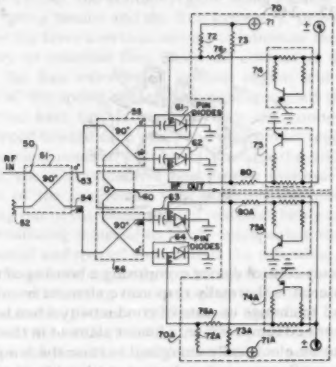
4,016,516
REFLECTIVE SIGNAL CONTROLLER

Walter A. Sauter, Malibu, and David R. Martin, Simi Valley, both of Calif., assignors to American Nucleonics Corporation, Woodland Hills, Calif.

Continuation-in-part of Ser. No. 473,427, May 28, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,600

Int. Cl.² H01P *1/22*

U.S. Cl. 333—81 R **5 Claims**



1. A signal controller for continuously varying the amplitude and polarity of an alternating signal comprising:

a first hybrid coupler including an input terminal, a termination terminal, a 0° terminal and a 90° terminal,

said input terminal of said first hybrid coupler connectable to a source of alternating signal to be controlled,

a second hybrid coupler including an input terminal, a termination terminal, a 0° terminal and a 90° terminal,

said input terminal of said second hybrid coupler connected to the 0° terminal of said first hybrid coupler,

a third hybrid coupler including an input terminal, a termination terminal, a 0° terminal and a 90° terminal,

said input terminal of said third hybrid coupler connected to the 90° terminal of said first hybrid coupler,

respective PIN diodes each having one terminal connected to a respective one of the 0° and 90° terminals of said second and third hybrid couplers;

the second terminal of each of said PIN diodes being grounded;

bias means for said PIN diodes;

said bias means comprising static first bias source for establishing the conduction of said PIN diodes for producing a minimum transfer of alternating signal throughout said signal controller,

said bias means including continuously controllable and polarity reversible second bias source to provide varying degrees of impedance mismatch of the said controller to said source of alternating signals whereby energy is reflected from said PIN diodes by reason of impedance mismatch thereof to said second and third hybrid couplers,

the termination terminals of said second and third hybrid couplers coupled together and constituting the output terminal of said signal controller.

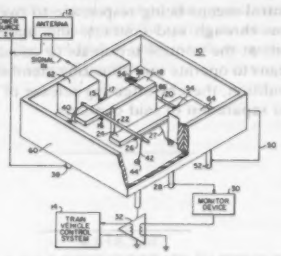
4,016,517
SIGNAL BANDPASS FILTER APPARATUS

Arun P. Sahasrabudhe, Monroeville, and Thomas C. Matty, North Huntingdon, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 14, 1975, Ser. No. 604,740

Int. Cl.² H03H *9/02, 9/26;* **B60Q** *11/00*

U.S. Cl. 333—71 **7 Claims**



1. In a signal bandpass filter apparatus operative with an input signal having a predetermined frequency and a load device, the combination of:

first means responsive to said input signal for providing a first electrical to mechanical energy conversion;

second means operative with said first means for providing a second mechanical to electrical energy conversion;

third means operative with said second means for providing an output signal to said load device; and

fourth means connected to supply a direct current voltage signal through said first means and through said second means for determining the operational integrity of said apparatus by disabling the passage of said input signal to said load device when a predetermined failure of said apparatus occurs.

4,016,518
CIRCUIT BREAKER WITH IMPROVED SINGLE COIL ACTUATOR AND UNDERVOLTAGE RELEASE MECHANISM

Walter W. Lang, South Beaver Township, and Alan B. Shimp, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 25, 1975, Ser. No. 616,709

Int. Cl.³ H01H *83/12*

U.S. Cl. 335—7 **19 Claims**

1. A circuit interrupter, comprising:

separable contacts;

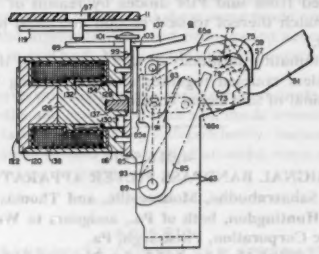
trip means operable upon actuation to effect separation of said contacts; and

a releasable actuator comprising:

an actuating member operable between first and second conditions, said actuating member actuating said trip means when operated to said second condition;

means for biasing said actuating member toward said second condition;

unitary operating means for operating said actuating member between said first and second conditions, said operating means being disposed in relation to said actuating member and responsive to a single control signal; and



control means connected to said operating means for generating said control signal, said control means being coupled to said contacts and to control terminals, said control means being responsive to overcurrent conditions through said contacts and undervoltage conditions at the control terminals to cause said operating means to operate said actuating member to said second condition, thereby effecting release of said trip means and separation of said contacts.

4,016,519

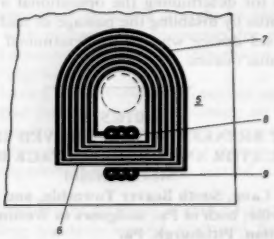
PRINTED CIRCUIT COILS

Dieter Haas, Hildesheim, Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Germany

Filed May 14, 1976, Ser. No. 686,520

Int. Cl.² H01F *27/28*

U.S. Cl. 336—200 **3 Claims**



1. A printed circuit coil of spiral configuration on the surface of a plate of insulating material composed of a layer of conducting material in a continuous spiral path with a substantially constant spacing between adjacent turns thereof and incorporating the improvement wherein a sector of said spiral including a part of each complete turn passing thereacross is of smaller path width than the remainder of said spiral path.

4,016,520

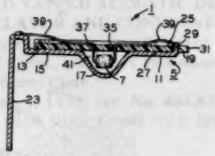
THERMOSTAT AND ANTICIPATOR THEREFOR AND METHODS OF OPERATING AND MAKING SUCH

Wiley M. Hummel, Morrison, Ill., assignor to General Electric Company, Fort Wayne, Ind.

Filed Nov. 4, 1974, Ser. No. 520,894

Int. Cl.² H01H *61/02*

U.S. Cl. 337—100 **70 Claims**



1. An anticipator for controlling the cycle rate and the droop of a temperature responsive member utilized in a thermostat, the anticipator comprising means for transferring heat supplied thereto to the temperature responsive member of the thermostat, said heat transferring means including a chamber therewithin and generally isolated from ambient atmosphere to which said heat transferring means is subjected, and means enclosed within said chamber of said heat transferring means and predeterminately spaced from engagement with said heat transferring means for supplying the heat thereto.

4,016,521

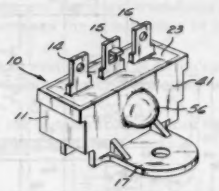
THERMAL LIMITER

Joseph F. Seybold, c/o Accurate Electronics Corp., 169 S. Abbe Road, P.O. Box R, Elyria, Ohio 44035

Filed May 23, 1975, Ser. No. 580,230

Int. Cl.² H01H *81/30*

U.S. Cl. 337—241 **4 Claims**



1. A circuit control device comprising a housing of thermoplastic material, a thermally responsive element in said housing adapted to change its state of conductivity when heated to a predetermined temperature, a heater element in the housing arranged to be electrically energized to raise the temperature of said thermally responsive element, a plurality of electrical terminals selectively connected to said heater element and said thermally responsive element whereby said heater element is arranged to be energized by an electrical source of energy external of said housing and said thermally responsive element is arranged to alter a circuit connected to said terminals, said housing defining a cavity, said heater element and said thermally responsive element being disposed in said cavity, substantially all of said cavity not occupied by said elements being occupied by a gas, a wall of said housing including an outer surface adapted to undergo a physical change perceptible externally of the housing when heated to a critical flow temperature, said heater being arranged in heat transfer relationship relative to said thermally responsive element and said wall such that said outer surface of said wall reaches said critical flow temperature and said physical change occurs at substantially the same time said thermally responsive element reaches said predetermined temperature and said change in

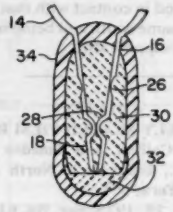
conductivity state occurs whereby visual inspection of said housing wall reveals the condition of said thermally responsive element, said heater element being adapted to heat said wall by substantial radiation energy transfer.

4,016,522

THERMAL SWITCH DEVICE AND METHOD OF MAKING

Larry Lee Sharp, Schaumburg, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Dec. 22, 1975, Ser. No. 642,971
Int. Cl.² H01H 37/76
U.S. Cl. 337—403 **7 Claims**



1. A thermal switch device comprising a pair of electrical conductor wire members in side by side relationship to each other and having free ends extending generally in the same direction, a localized contact region on the pair of conductor wire members providing an electrically conductive path between the wire members, the free extremities of the conductor wire members being adjacent the contact region but spaced downwardly therefrom, thereby forming a lever arm portion, at least one of said conductor wire members including a spring means to bias the opposing contact regions and adjoining lever arm portions of the pair of conductor wire members away from each other, the contact region, being located intermediate the spring means and the free extremity, providing a fulcrum for the lever arm thus serving to minimize the unit force necessary to establish firm electrical contact at the contact region, the free extremities, contact region and at least a portion of the spring means being encapsulated with a nonconductive heat fusible material with the conductor wires being forced toward each other and the contact regions forced into electrical contact with each other by the encapsulating material, the nonconductive heat fusible material as weli as portions of the conductor wire adjacent the spring means extending out of the encapsulated material, being coated with a rigid insulating material to totally encapsulate the heat fusible material and spaced and insulate the extending conductor wire portions from each other, wherein the encapsulating heat fusible material acting on the contact regions and lever arm applies suitable pressure to maintain electrical contact between said two conductor wire members until said heat fusible material is subjected to a predetermined temperature level, at which level the fusible material flows, releasing the stored energy in the spring means to open the circuit.

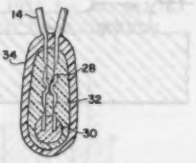
4,016,523

THERMAL SWITCH DEVICE

Edward Frank Sidor, Lombard, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Dec. 22, 1975, Ser. No. 642,973
Int. Cl.² H01H 37/76
U.S. Cl. 337—403 **6 Claims**

1. A thermal switch device comprising a pair of conductor wire members in side by side relationship to each other and having free ends extending generally in the same direction, at least one of said wire members including a first, upper region, a second, intermediate region and a third, lower region including a free extremity of the wire member, a first spring means between the first and second regions biasing the second region outwardly relative to the first region, a second spring means between the second and third regions biasing the third region outwardly relative to the second region, a contact region on the conductor wire member located intermediate the first spring means and the third region, solid heat fusible means surrounding the second and third region and a portion of the first region serving to retain the three regions in a first position against the bias of the first spring means and further bringing the contact regions into electrical contact under the force of the energy created by the second spring means, nonconduc-



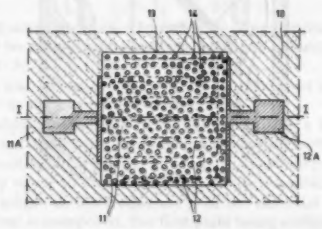
tive means surrounding the heat fusible means supporting and retaining the first upper regions in a predetermined insulated spaced relationship to each other, wherein the heat fusible means retains the conductor wire members in electrical contact with each other until said heat fusible means is exposed to a predetermined temperature level, wherein the fusible means liquifies responsive to the predetermined temperature, releasing the energy of the spring means to open the circuit between the conductor wire members and place the three regions in a second position.

4,016,524

SENSOR FOR A GAS DETECTOR, IN PARTICULAR FOR SMOKE DETECTION

Jean Pompei, Noisy-Le-Roi; Bernard Lacroix, Paris, and Francis Pierrot, Rueil-Malmaison, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 14, 1975, Ser. No. 577,314
Claims priority, application France, May 27, 1974, 74.18212
Int. Cl.² H01L 7/00
U.S. Cl. 338—34 **3 Claims**

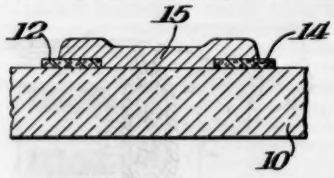


1. Sensor for selectively detecting at least one constituent of a gaseous mixture in contact with the sensor, the operation of this sensor being based on the variation of its electrical resistance by a reaction at the surface of the sensor, characterized in that the sensor comprises a substrate on which a layer of a semiconductor is provided to which are connected at least two electrodes and which is at least partly covered with a film of a dielectric material formed with a large number of microscopic openings.

4,016,525
GLASS CONTAINING RESISTOR HAVING A SUB-MICRON METAL FILM TERMINATION

John P. Maher, Adams, and Theodore W. Johnson, Williamstown, both of Mass., assignors to Sprague Electric Company, North Adams, Mass.

Filed Nov. 29, 1974, Ser. No. 528,052
Int. Cl.² H01C 1/012
U.S. Cl. 338—309 7 Claims

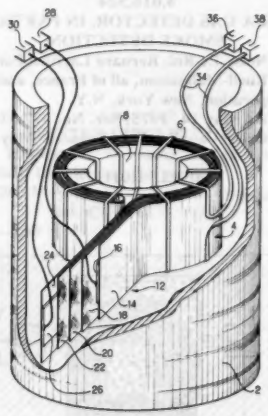


1. A resistor comprising an insulating substrate; submicron noble metal film terminations being bonded to said substrate; a glass containing resistor layer, distal portions of said resistor layer having overlapping contact with said terminations; and manganese dioxide particles being contained in and constituting at least 17 weight percent of said terminations thereby reducing residual stresses in said terminations and improving the quality of the junction between said terminations and said resistor layer.

4,016,526
SUPERCONDUCTIVE SWITCH

Brigitte Gamet, Leuville-sur-Orge, and Jean-Claude Renard, Chilly Mazarin, both of France, assignors to Compagnie Generale d'Electricite, Paris, France

Filed Mar. 21, 1975, Ser. No. 560,451
Claims priority, application France, Apr. 18, 1974, 74.13556
Int. Cl.² H01L 43/08
U.S. Cl. 338—325 4 Claims

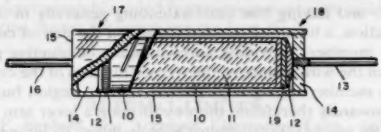


1. Superconductive switch comprising:
Two main terminals;
A superconductive winding connected between said two main terminals;
Means for keeping a cryogenic fluid in contact with said winding, so that it may be in its superconductive state;
Two control terminals;
And a control winding connected between said two control terminals and making it possible to apply to said control winding a magnetic field suitable for making it change over to its resistive state;
And characterized in that:
The conductor forming said superconductive winding is in the form of a superconductive strip whose width is substantially parallel to the axis of that winding;
A permeable strip whose width is also parallel to said axis is placed in contact with at least one face of said superconductive strip on the greatest part of the length of the latter, that permeable strip consisting of a material suitable for allowing the flowing of the cryogenic fluid in its pores so as to bring the fluid into contact with said face of the superconductive strip; and
Said superconductive strip forms a thin layer fixed onto one face of a support insulating strip, and remains at a distance from the two edges of that support strip, said permeable strip placed in contact with that thin layer having substantially the same width and being substantially coextensive with said support strip.

4,016,527
HERMETICALLY SEALED FILM RESISTOR

Gaylord L. Francis, Califon, and Amedeo J. Morelli, Randolph, both of N.J., assignors to North American Philips Corporation, New York, N.Y.

Filed Sept. 25, 1975, Ser. No. 616,651
Int. Cl.² H01C 1/02
U.S. Cl. 338—274 24 Claims



1. A hermetically sealed electrical device comprising
an electrical component comprising a core element coated with a resistive film material, and a refractory metal coating over the ends of said core element in electrical contact with said resistive film material;
a substantially cylindrical glass element surrounding said component and providing a hermetic seal;
a pair of flexible metal leads axially extending from said device; and
a coupling element between said component and said leads, comprising a solderable preform of a soft alloy for providing strain relief from the differential shrinking between said glass element and said electrical component at each end.

4,016,528
MOVING TARGET DETECTOR

Yasuhito Takeuchi, Kunitachi, Japan, assignor to Hewlett-Packard Company, Palo Alto, Calif.

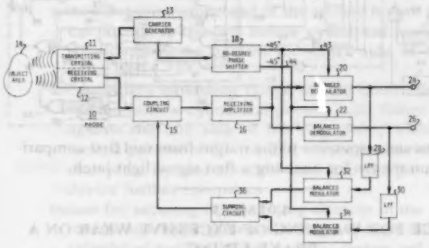
Filed Nov. 24, 1975, Ser. No. 634,955
Claims priority, application Japan, Dec. 23, 1974, 49-147873
Int. Cl.² G01S 9/66
U.S. Cl. 340—1 R 5 Claims

1. A system for detecting moving objects within an object area of investigation by suppressing stationary components and amplifying doppler-shift components of acoustic signals reflected from stationary and moving objects within the area of investigation, said system comprising:
carrier generator means for generating a sinusoidal input carrier signal of constant amplitude and constant frequency;
signal transmitter means connected to said carrier generator means for transmitting an acoustic signal to the object area in response to said input carrier signal;
signal receiver means responsive to acoustic signals re-

flected from stationary and moving objects within said object area for converting said reflected acoustic signal to an analog signal having carrier, stationary and doppler-shift components;

signal coupling means having an input terminal coupled to said signal receiver means and having a feedback terminal for subtracting feedback signals received at the feedback terminal from analog signals received at the input terminal, and for producing a resultant analog signal having primarily doppler-shift components;

phase shifter means coupled to said carrier generator means and having a pair of output terminals for producing a pair



of phase-shifted carrier signals in response to said input carrier signal;

paired demodulator means each coupled to said signal coupling means and to an output terminal of said phase shifter means for producing a pair of demodulated analog signals, phase shifted with respect to each other, and having primarily doppler-shift components; and

signal feedback means coupled to said paired demodulator means and to the feedback terminal of said coupling means for providing a feedback signal to said signal coupling means, said feedback signal having primarily carrier and stationary components.

4,016,529

BODY DETECTING DEVICE

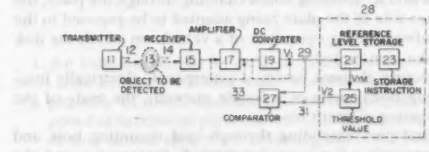
Tsuneki Inuzuka, Fuchu; Katsushi Furuichi, Yokohama; Osamu Sawamura, Yamato; Yoshimasa Kimura, Kawasaki, and Hisashi Sakamaki, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 25, 1975, Ser. No. 571,553

Claims priority, application Japan, May 1, 1974, 49-49219

Int. Cl.² G01S 9/66

U.S. Cl. 340—1 R **15 Claims**



1. A device for detecting a body at a predetermined position comprising:

means for generating a detecting signal;

receiver means for receiving the signal from said signal generating means;

means for setting the value of a reference signal in response to the signal received from said receiver means in the absence of a said body at said predetermined position, to correct said reference signal in response to variations in ambient conditions, wherein said reference signal is for providing a reference for use in determining whether a said body is present at said predetermined position;

means for storing the reference signal, and

comparator means connected to compare said reference signal from said storage means with a signal received by said receiver means, wherein the output of said comparator means provides an indication of the presence or absence of said body at said predetermined position.

4,016,530

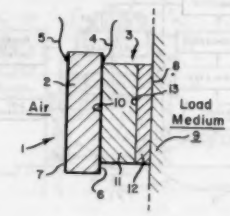
BROADBAND ELECTROACOUSTIC CONVERTER

Jeffrey H. Goll, 500 W. University Parkway, Apt. 6B, Baltimore, Md. 21210

Filed June 2, 1975, Ser. No. 582,763

Int. Cl.² H04B 11/00

U.S. Cl. 340—15 **13 Claims**



1. A broadband electroacoustic converter for converting between electrical signals carried on a network having a characteristic electrical impedance R_e and acoustic signals carried in a load medium having a characteristic acoustic impedance Z_m, the signals characterized by frequencies in a range centered about a center frequency f_o, said electroacoustic converter comprising:

a. an electrical port through which the electrical signals may pass between the converter and the network;

b. a piezoelectric transducer comprising a thin plate of a piezoelectric material and a pair of electrodes mounted on opposing faces of the plate, the transducer having a half-wave resonance frequency f_T and an active area A, the piezoelectric material being characterized by a thickness-mode electromechanical coupling constant k_t, a clamped dielectric constant along the thickness axis ϵ_t, an acoustic phase velocity along the thickness axis v_t, and an acoustic impedance Z_T, said active area A being approximately equal to

$$\frac{k_t^2 v_t}{\pi^2 \epsilon_t f_T^2 R_e}$$

said half-wave resonance frequency f_T being approximately equal to f_o, and said coupling constant k_t being greater than 0.3;

c. electrical means connecting the electrodes of the transducer to the electrical port;

d. a double-layer acoustic coupler comprising a first plate and a second plate adjoining and in acoustic contact with one another, the thickness of each plate being approximately equal to an odd-multiple of the acoustic quarter-wave length at the frequency f_o in the material of which the plate is composed, the first plate being composed of a material having an acoustic impedance approximately equal to $(Z_T^3 Z_m)_{1/4}$, the second plate being composed of a material having an acoustic impedance approximately equal to $(Z_T Z_m^3)_{1/4}$;

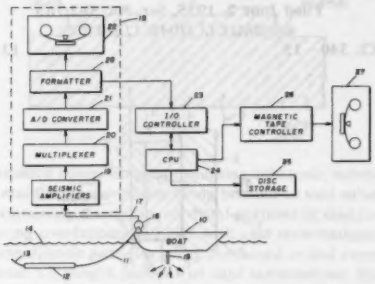
e. connecting means attaching the acoustic coupler to the piezoelectric transducer with one face of the first plate adjoining and in acoustic contact with one face of the transducer; and

f. an acoustical port through which acoustical signals may pass between the converter and the load medium comprising a face of the second plate.

4,016,531
SYSTEM FOR RECORDING SEISMIC REFLECTION SIGNALS IN SERIAL-BY-TRACE FORMAT

Thomas W. Cook; Wayne A. Penner; Carl A. Quaglino; Charles D. Ray, all of Dallas, and Lyndell F. Scott, Irving, all of Tex., assignors to Mobil Oil Corporation, New York City, N.Y.

Filed Apr. 28, 1975, Ser. No. 572,471
Int. Cl.² G01V *1/24*
U.S. Cl. 340—15.5 DP **4 Claims**



1. In a method of seismic exploration wherein seismic reflection signals are recorded in a plurality of recording channels which are sequentially sampled to provide a serial output of multiplexed samples of the seismic reflection signals, the improvement comprising the steps of:

a. gathering a first set of said multiplexed samples into core memory such that the samples of said first set are reoriented serially by channel in successive address locations of said core memory,

b. transferring said serially oriented samples sequentially from said successive address locations of said core memory onto a first storage section of a cyclical storage device, the serial samples for each channel being stored on a separate recording sector in said first section,

c. repeating steps (a) and (b) for each of a plurality of sets of samples until all samples of the seismic reflection signals resulting from a single seismic pulse have been stored on recording sectors in a corresponding plurality of sections of said cyclical storage device,

d. reading sequentially out of said cyclical storage device sections those sectors of stored samples comprising a first of said plurality of channels,

e. repeating step (d) for each of said plurality of channels, and

f. recording each sector of samples serially as it is read out of said cyclical storage device in steps (d) and (e) to produce a serially oriented by trace seismic record of the seismic reflection signals.

4,016,532
EMERGENCY TRAFFIC CONTROL SYSTEM WITH SECURITY TRANSMISSION CODING

Levi L. Rose, P. O. Box 22, Posen, Ill. 60469

Filed Nov. 5, 1975, Ser. No. 629,150
Int. Cl.² G08G *1/00*
U.S. Cl. 340—32 **6 Claims**

1. An emergency system for remotely controlling the light latches associated with traffic signal lights comprising:

a. a remotely located transmitter means including:

i. first and second RF oscillators,

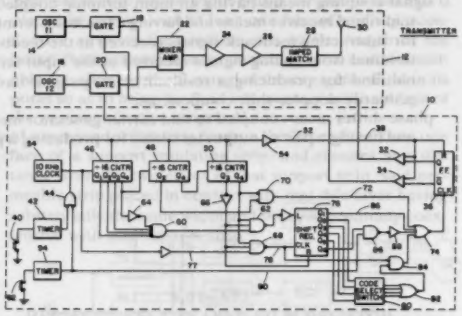
ii. means for transmitting the signals generated by said oscillators,

iii. means for generating a binary code,

iv. logic means for gating the output of said first or second oscillator to said transmitting means according to said code thereby to transmit a binary coded RF signal;

b. means for receiving the binary coded RF signals including:

i. first means for comparing said coded signal and producing an output indicative of a match,

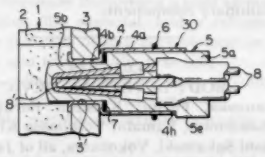


ii. means responsive to the output from said first comparison means for enabling a first signal light latch.

4,016,533
DEVICE FOR WARNING OF EXCESSIVE WEAR ON A BRAKE LINING

Masakazu Ishikawa; Sadayoshi Ito; Hiroyuki Oka, all of Toyota; Kennoske Iida, Iwatsuki; Kenji Usui, Susono, and Masayoshi Asaba, Gotenba, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 21, 1974, Ser. No. 516,577
Claims priority, application Japan, Apr. 26, 1974, 49-47841[U]
Int. Cl.² B60R *25/10*; F16D *66/02*
U.S. Cl. 340—52 A **3 Claims**



1. A device for warning of excessive brake lining wear in a disc brake for a vehicle, the device including:

a rear support plate of a disc brake for a wheel of a roadway vehicle, said plate having a brake lining attached to one side and a mounting hole extending through the plate, the other side of the plate being adapted to be exposed to the roadway during operation of a vehicle on which the disk brake is mounted;

a detecting element having a waterproof, electrically insulating body made of a fragile material, the body of the detecting element having

a first part extending through said mounting hole and projecting for a predetermined distance beyond the one side of the rear plate,

a second part projecting from the other side of the rear plate, and

means adapted to connect the detecting element to a warning circuit for warning the operator of a vehicle on which the disc brake is mounted when the brake lining becomes worn to a thickness less than said predetermined distance; wherein the improvement comprises:

the first part of the body of the detecting element being a cylinder having a first diameter; the second part of the body being a cylinder having a second diameter larger than the first diameter and a shoulder joining the first and second cylinders;

a metallic means attached to the rear plate and surrounding the second part of the fragile body for protecting said body from breakage by foreign objects when the vehicle is in operation;

said metallic means comprising a first hollow cylindrical portion covering and slidably holding the second part of the body of the detecting element and

a second hollow cylindrical portion having an outside diameter smaller than the outside diameter of the first hollow portion that slidably fits within the mounting hole through the rear plate, an inside diameter that slidably holds the cylindrical first part of the body of the detecting element, and a length equal to the thickness of the rear plate;

a shoulder joining one end of the second hollow cylindrical portion to the first hollow cylindrical portion, said shoulder bearing against the other side of the rear plate; and

an outwardly extending flange on the other end of the second hollow cylindrical portion, said flange bearing against the one side of the rear plate, whereby the second portion of the metallic means is attached to the rear plate by said shoulder and said flange, and said device further comprises

means for securing the detecting element in the metallic means and biasing means acting between the hollow cylindrical portion of the metallic means and the second part of the detecting element to prevent looseness of said detecting element in said metallic means.

4,016,534

INDICATOR DEVICE FOR AUTOMOBILES

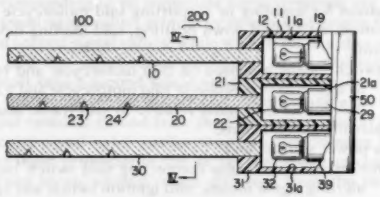
Ikuya Kobayashi; Hiroshi Arai; Jun Ohta, and Minoru Izawa, all of Aichi, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Aug. 12, 1975, Ser. No. 603,806

Claims priority, application Japan, Aug. 30, 1974, 49-99744; Aug. 30, 1974, 49-99745; Sept. 19, 1974, 49-107937

Int. Cl.² B60Q *1/00*

U.S. Cl. 340—52 F **10 Claims**



1. An indicator device for indicating abnormalities in apparatus such as motor vehicles which comprises:

a plurality of abnormality sensor means respectively disposed at functional parts or objects in the apparatus, each of said sensor means for detecting abnormalities at said parts and for converting the occurrence of an abnormality into an electric signal;

a plurality of corresponding display lamps respectively connected to respective abnormality sensor means;

a plurality of switching circuit means for engaging the respective display lamps in response to signals from the abnormality sensor means;

a priority sequence determination circuit means for determining a priority order among the detection signals whereby abnormalities occurring at two or more functional parts simultaneously result in one of said display lamps corresponding to the detection signal of a higher priority being selectively energized; and

a plurality of indicating elements of transparent and light transmissible material arranged in layers, each of said indicating elements having thereon light reflecting means, each display lamp each being disposed, respectively, at the edge of one of the respective indicating elements.

4,016,535

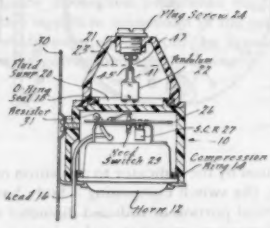
TILT ALARM FOR TRACTOR VEHICLE OR THE LIKE

Robert I. Dinlocker, Lansdale, Pa., assignor to Sheller-Globe Corporation, Toledo, Ohio

Filed Dec. 15, 1975, Ser. No. 640,972

Int. Cl.² G08B *21/00*

U.S. Cl. 340—52 H **13 Claims**



1. In a tractor like vehicle, suitable for use on lawns, gardens and the like, and including motive means for driving the tractor like vehicle by a person operating same,

the improvement comprising a special tilt alarm means for warning the operator when the vehicle is tilted in any direction beyond a predetermined desired angle of warning,

said tilt alarm means including, mounting and housing means for supporting the tilt alarm on the vehicle, a swinging pendulum magnet means operative in generally any direction,

upon swinging a predetermined amount away from its normal disposition, to cause actuation of the tilt alarm,

viscous damping fluid means, around said swinging means, for damping the movement of the swinging means to guard against premature actuation, said fluid means being non-mercury, warning indicator means for providing a warning to said operator upon said actuation caused by the swinging means,

electrical circuit means for operatively interconnecting the swinging means and the warning indicator means to enable actuation of said indicator means when said swinging means swings said predetermined amount away from its normal disposition,

said circuit means including a reed switch means generally oriented vertically such that the longitudinal axis of the reed switch and the swinging means are generally in line with one another, said reed switch means being activated when said swinging means swings said predetermined amount away from its normal disposition to thereby actuate said indicator means.

4,016,536

SPEED WARNING DEVICE

Leo La Chapelle, Los Angeles, Calif., assignor to Frank Rembert and Leo La Chapelle, both of Los Angeles, Calif., part interest to each

Filed Jan. 23, 1976, Ser. No. 651,947

Int. Cl.² B60Q *5/00*

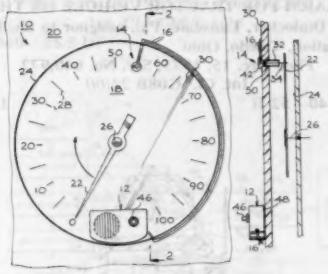
U.S. Cl. 340—62 **12 Claims**

1. An annunciator system for mounting in association with a speedometer or the like, comprising:

an annunciator unit having an electrical circuit operable by a switch to generate an audible signal; and

an activating switch connected in said circuit and adapted for mounting from outside an instrument adjacent a mov-

able indicator of the instrument at a selected warning position, the switch having a fine, resiliently flexible, conducting filamentary member supported from an insulated support member within the switch in a cantilever mounting and extending outwardly from a body of the switch into the path of the indicator of the instrument for



deflection by the indicator to a position of closure of said switch, the switch comprising a body having a generally cylindrical portion of reduced diameter extending along the filamentary member and a base portion of larger diameter relative to the diameter of the other portion to facilitate mounting of the switch in a hole in the cover plate of the instrument.

4,016,537

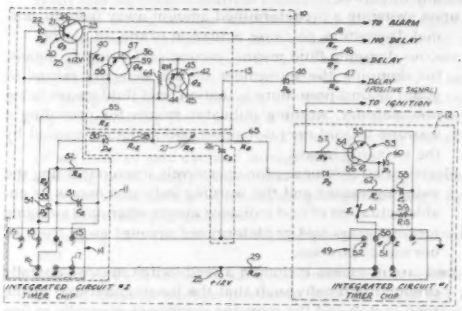
ALARM TRIGGERING CIRCUIT

Richard V. Ray, 7249 Petrol St., Los Angeles, Calif. 90723

Continuation-in-part of Ser. No. 595,763, July 14, 1975, abandoned. This application June 21, 1976, Ser. No. 697,996

Int. Cl.² B60R *25/10*

U.S. Cl. 340—64 **3 Claims**



1. In an alarm system for a motor vehicle which has a power source, an ignition system that provides a positive voltage when it is turned on and a ground when it is turned off, an alarm such as a horn or a siren, an alarm relay which is electrically coupled to the alarm, and a set of tampering switches which provide a ground when the motor vehicle is being entered into or tampered with by a would be thief, an alarm triggering circuit comprising:

a. alarm triggering means for providing a ground to the alarm relay thereby activating the alarm;

b. delaying means for providing a signal from the set of tampering switches to said alarm triggering means; and

c. setting means for setting said alarm triggering means when the ignition system is turned off, said setting means including:

1. a first timer chip having a trigger terminal, a reset terminal and an output terminal and being electrically coupled to the power source of the motor vehicle;

2. a first resistor of a first particular resistance being electrically coupled to the ignition system;

3. a first transistor having a base which is electrically coupled to said first resistor, an emitter which is electrically coupled directly to ground, and a collector;

4. a first diode electrically coupled to said trigger terminal of said first timer chip and to said collector of said first transistor;

5. a first capacitor of a first particular capacitance electrically coupled to ground and to said trigger terminal of said first timer chip;

6. a second resistor of a second particular resistance being electrically coupled to said trigger terminal of said first timer chip; and

7. a switch being electrically coupled to the power source of the motor vehicle and to said second resistor.

4,016,538

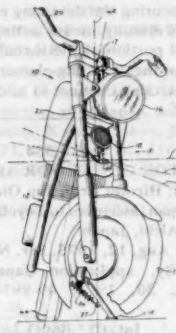
SAFETY DEVICE FOR A MOTORCYCLE

Marion Z. Miller, Rte. 1 Box 76A, Arcanum, Ohio 45304

Continuation-in-part of Ser. No. 552,155, Feb. 24, 1975, abandoned. This application Nov. 12, 1975, Ser. No. 631,407

Int. Cl.² B62H *1/02*

U.S. Cl. 340—134 **8 Claims**



1. An alerting device for a motorcycle having an ignition switch, a frame assembly and a stand movable from a down position for assisting in supporting said motorcycle to an up position out of said down position, said alerting device comprising:

switch means mounted on said motorcycle and responsive to a change in position of said motorcycle and a change in position of said stand relative to said frame assembly;

alerting signal means;

a power source; and

means for electrically connecting said switch means, said alerting signal means, said ignition switch and said power source so that said alerting signal means is energized when said ignition switch is actuated, said motorcycle is in a straightforward driving position, and said stand is downwardly from said up position to alert the operator of said motorcycle while riding that said stand is in an unsafe position.

4,016,539

ASYNCHRONOUS ARBITER

Takashi Nanya, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Sept. 10, 1974, Ser. No. 504,788

Claims priority, application Japan, Sept. 12, 1973, 48-103448; Sept. 12, 1973, 48-103451

Int. Cl.² H04Q *9/00*

U.S. Cl. 340—147 LP **2 Claims**

1. An asynchronous arbiter comprising:

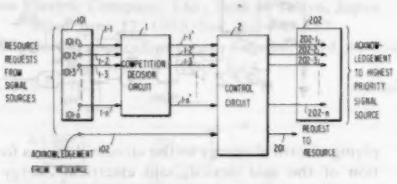
a. input means including a plurality of input terminals for receiving asynchronously generated request signals from a plurality of signal sources;

b. output means including a plurality of output terminals for providing an acknowledgement signal to the highest priority signal source;

c. another input terminal for receiving an acknowledgement from a resource and another output terminal for providing a request to the resource;

d. competition decision circuit means connected to said input means having a plurality of decision output terminals equal in number to the input terminals of the input means and having one-to-one correspondence thereto for setting a usual signal value tha is arbitrarily determined among first and second signal values when all of the input terminals of said input means are at said first signal value of a binary signal, while when a part or all of the input terminals of said input means become the second signal value of the binary signal, only one decision output terminal corresponding to the input terminal turned from the first signal value to the second signal value earliest among the input terminals taking the second signal value changes to an unusual signal value difference from the usual value, said competition decision circuit means preserving the order of the occurrence of the changes from the first signal value to the second signal value of the respective input terminals of the input group; wherein said competition decision circuit means comprises:

i. a plurality of signal suppressor circuits equal in number to all the possible combinations of two taken from the number of said plurality of input terminals, each signal suppressor functioning in such a manner that when both of two input terminals of the signal suppressor circuit take a first signal value of a binary signal, both



of two output terminals of the signal suppressor circuit corresponding to its respective input terminals are set at usual signal values arbitrarily determined among first and second signal values, while when both or either one of said two input terminals of the signal suppressor circuit take a second signal value, the output terminal of the signal suppressor circuit corresponding to the input terminal turned from the first signal value to the second signal value earlier than the other among the two input terminals of the signal suppressor circuit is turned to an unusual value different from the usual value;

ii. a plurality of logic circuits each producing at its output a logical product of its inputs;

iii. means for connecting said input means to said signal suppressor circuits in such a manner that with regard to an arbitrarily selected pair of the input terminals in said input means the output states of said signal suppressor circuits represent which one of the two input terminals has been turned from the first signal value to the second signal value earlier than the other; and

iv. means for connecting the output terminals of the signal suppressor circuits to the input terminals of the plurality of the logic circuits in such a manner that the output states of the plurality of the logic circuits represent which one of the input terminals in said input means has changed earliest from the first signal value to the second signal value; whereby the decision circuit means determines and stores the order of changes in values of the signals so asynchronously applied to said input group means from the plurality of signal sources; and

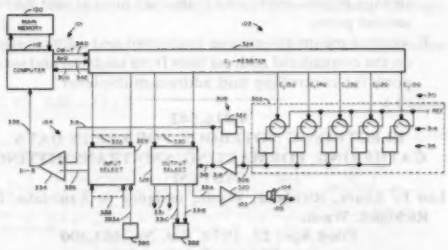
e. control circuit means for generating a request signal at said another output terminal in response to any arbitrary one of the decision output terminals in the decision circuit turned from the usual value to the unusual value, and when an acknowledgement signal at said another input terminal changes in response to the signal change at said another output terminal a signal value at a particular output terminal in the output means determined with reference to the states of the decision output terminals in said decision circuit means changes in accordance with the signal change at said another input terminal whereby among a plurality of signals so asynchronously generated from a plurality of mutually independent binary signal sources as to vie with each other, the signal generated earliest is given the highest preference for transmitting the respective signals in succession to the resource, and the acknowledgement signal from the resource can be returned to the corresponding signal source.

4,016,540

APPARATUS AND METHOD FOR PROVIDING INTERACTIVE AUDIO COMMUNICATION

Gilbert Peter Hyatt, P.O. Box 4584, Anaheim, Calif. 92803

Continuation-in-part of Ser. Nos. 101,881, Dec. 28, 1970, and Ser. No. 134,958, April 19, 1971, and Ser. No. 135,040, April 19, 1971, and Ser. No. 230,872, March 1, 1972, and Ser. No. 232,459, March 7, 1972, and Ser. No. 246,867, April 24, 1972, and Ser. No. 288,247, Sept. 11, 1972, and Ser. No. 229,213, April 13, 1972, Pat. No. 3,820,894, and Ser. No. 291,394, Sept. 22, 1972, and Ser. No. 302,771, Nov. 1, 1972.
This application Jan. 22, 1973, Ser. No. 325,933
Int. Cl.[2] G06F *3/16*; H04M *1/00*
U.S. Cl. 340—172.5 **31 Claims**



1. A monolithic system for communicating with an operator, said system comprising:

command means for generating at least one output signal, wherein said command means comprises monolithic data processor means for processing digital sound information and read only memory means for storing the sound information; and

sound means for generating a sound message in response to the output signal, wherein said sound means comprises monolithic signal processing means for processing the output signal and transducer means for generating a sound message in response to the processed output signal.

4,016,541

MEMORY UNIT FOR CONNECTION TO CENTRAL PROCESSOR UNIT AND INTERCONNECTING BUS

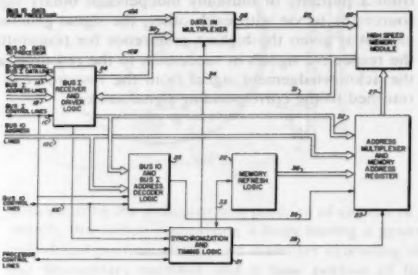
Bruce A. Delagi, Acton; Joseph Paul Zeh, Maynard, and Rony Elia-Shaoul, Belmont, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 295,810, Oct. 10, 1972, abandoned. This application Apr. 17, 1974, Ser. No. 461,752

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 20, 1976

Int. Cl.[2] G06F *3/00*

U.S. Cl. 340—172.5 **4 Claims**



1. A random access memory unit for connection to a digital computer system including a central processor unit and a bidirectional bus with data, control and address lines, the bus having a characteristic finite propogation delay time, said memory unit comprising:

A. addressable storage means, said memory unit storing and retrieving data from said addressable storage means during memory cycle operations each having a duration which is less than the characteristic propogation delay time for the bus,

B. a first port with data, control and address lines for connection to the corresponding lines in the bus,

C. a second port with data, control and address lines for direct connection to corresponding lines in the central processor unit,

D. an address multiplexer responsive to signals from said address lines at said first and second ports for passing a selected address therethrough to identify a unique location in said storage means,

E. data connection means for coupling data to and from said storage means and to and from data lines at said first and second ports,

F. control means responsive to control and address signals on the control and address lines from said first and second ports for controlling said address multiplexer.

4,016,542

ELECTRONIC NOTEBOOK FOR USE IN DATA GATHERING, FORMATTING AND TRANSMITTING SYSTEM

Leo L. Azure, Richland, Wash., assignor to Azurdata, Inc., Richland, Wash.

Filed Apr. 23, 1974, Ser. No. 463,400

Int. Cl.[2] G06F *3/14, 17/06*

U.S. Cl. 340—172.5 **74 Claims**

1. A self-contained, hand-held portable data collection device for receiving and storing character data for subsequent read-out and transmission of the character data in a desired format to a utilization means, comprising:

entry means for supplying coded signal representations of character data and controls, the character data coded signals to be stored in said device at addresses determined in accordance with control coded signals associated with the character data coded signals,

A random access memory having plural character data storage positions arranged in plural lines, each line including plural said storage positions,

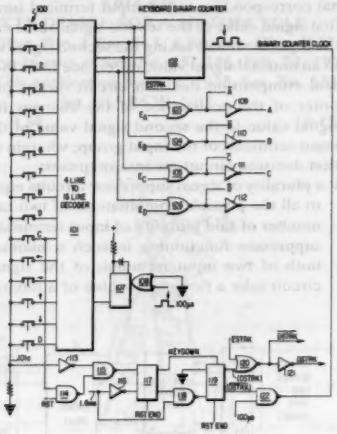
means for addressing the memory in accordance with the control coded signals for entry and storage of the character data coded signals in an addressed position,

display means for visually displaying characters represented by character data coded signals,

output connection means,

said addressing means including means for selectively addressing said memory for reading out character data coded signals stored in positions of said memory and for selectively supplying said signals read out from said memory to said display means for display thereof, and to said output connection means to be available for transmission thereof to a utilization means, and

electrical energy storing means integral with said self-contained hand-held portable data collection device for supplying electrical energy to the aforesaid means for operation of the said device, said electrical energy storing means comprising:



first and second energy storing cells, and means connecting said first and second energy storing cells normally to enable said first cell to supply electrical energy as aforesaid and to permit depletion of substantially all electrical energy stored in said first cell prior to depletion of the electrical energy stored in said second cell, said connecting means being responsive to depletion of the electrical energy stored in said first cell below a predetermined level, automatically to enable said second cell to supply energy to at least said memory means for maintaining storage of said coded signals theretofore entered and stored therein.

4,016,543

PROCESSOR ADDRESS RECALL SYSTEM

Theodore A. Franks, Cinnaminson, and Charles L. Kapeghian, Vincentown, both of N.J., assignors to Formation, Inc., Mt. Laurel, N.J.

Filed Feb. 10, 1975, Ser. No. 548,662

Int. Cl.[2] G06F *11/00, 11/06*

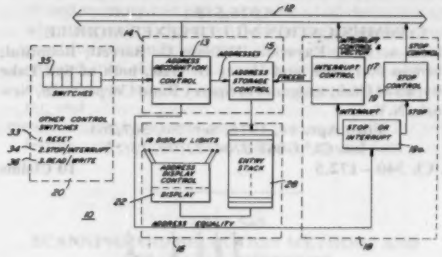
U.S. Cl. 340—172.5 **19 Claims**

1. An address recall system coupled to a data processor system which includes a data processor, memory means and at least one peripheral unit for detecting and retrieving a predetermined number of processor system executed memory address signals, comprising:

a. switch means for generating a first set of signals corresponding to a predetermined address within said processor system;

b. control means for receiving address signals executed in said processor system and for detecting said predetermined address;

c. storing means comprising a group of registers for storing a predetermined number of said processor system executed address signals received by said control means; and,



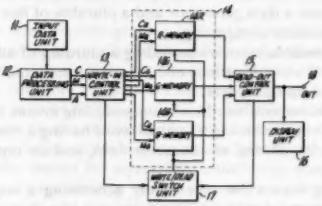
d. means for retrieving said processor system executed address signals contained in said group of registers when said predetermined address is detected in said control means.

4,016,544

MEMORY WRITE-IN CONTROL SYSTEM FOR COLOR GRAPHIC DISPLAY

Takaya Morita; Masao Inaba, and Yoitiro Hoshi, all of Tokyo, Japan, assignors to Tokyo Broadcasting System Inc. and Nippon Electric Company, Ltd., both of Tokyo, Japan

Filed June 17, 1975, Ser. No. 587,857
Claims priority, application Japan, June 20, 1974, 49-70421
Int. Cl.² G06F *3/14*
U.S. Cl. 340—172.5 **4 Claims**



1. A color graphic display system for displaying data supplied from a data processing unit on a display unit, said data having been stored and processed in said data processing unit in accordance with an instruction received from a data input means, said display system comprising:

memory means for storing data from said data processing unit;

means operatively interposed intermediate said data processing unit and said memory means for controlling the write-in of data in said memory means;

means operatively connected to said memory means for controlling the read-out of the data stored in said memory means;

means for supplying the read out data to said display unit;

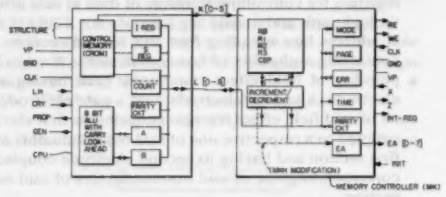
said data from said data processing unit including color designating bits, mask command bits, and address data, and means for controlling said write-in controlling means in accordance with said mask command bits, said last-mentioned means including means for changing the content of the location in said memory means specified by said address data in accordance with said color designating bits when said mask command bits are of one logic level and for maintaining the content of said memory location unchanged when said mask command bits are of the other logic level.

4,016,545

PLURAL MEMORY CONTROLLER APPARATUS

G. Jack Lipovski, Gainesville, Fla., assignor to Harris Corporation, Cleveland, Ohio

Filed July 31, 1975, Ser. No. 600,632
Int. Cl.² G06F *13/00, 9/20*
U.S. Cl. 340—172.5 **22 Claims**



1. A general purpose digital computer comprising:

a central processing unit located on a first semiconductor chip;

a plurality of memories located on a plurality of second semiconductor chips;

a plurality of memory controllers associated with, and connected to, said plurality of memories, respectively, each located on a semiconductor chip other than said first semiconductor chip;

a plurality of bidirectional lines interconnecting said central processing unit and said memory controllers for transmission of data and control bits between said central processing unit and said memory controllers;

each of said memory controllers including means for storing a mode vector which enables their associated memory for various operations;

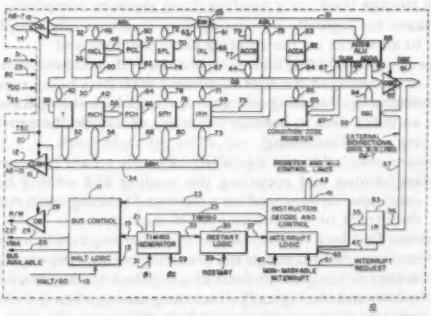
a first logic means on each of said memory controllers for allowing said central processing unit access to their associated memory as a function of said bits on said bidirectional lines and said mode vector stored in said memory controllers.

4,016,546

BUS SWITCH COUPLING FOR SERIES-COUPLED ADDRESS BUS SECTIONS IN A MICROPROCESSOR

Thomas H. Bennett; Earl F. Carlow, both of Scottsdale; Anthony E. Kouvoussis, Phoenix, all of Ariz.; Rodney H. Orgill; Charles Peddle, both of Norristown, Pa., and Michael F. Wiles, Phoenix, Ariz., assignors to Motorola, Inc., Chicago, Ill.

Division of Ser. No. 519,150, Oct. 30, 1974. This application Sept. 17, 1975, Ser. No. 614,033
Int. Cl.² G06F *9/20*
U.S. Cl. 340—172.5 **4 Claims**



1. A microprocessor unit comprising:

a data bus;

an address bus;

a plurality of registers coupled between said data bus and said address bus for storing digital information to effect operation of said microprocessor unit;

an arithmetic logic circuit coupled between said address bus and said data bus for performing computations on digital information to effect operation of said microprocessor unit;

control means coupled to said arithmetic logic unit and said registers for controlling transfers of data at said arithmetic logic unit and at said registers;

said address bus including first and second sections each containing a plurality of bus conductors;

a plurality of field effect transistors, each having a first electrode, a second electrode, and a gate electrode;

each of said field effect transistors having its first electrode coupled to a respective one of said bus conductors of said first section and having its second electrode coupled to a corresponding one of said bus conductors of said second section;

said control means being coupled to the gate electrodes of each of said field effect transistors for electrically coupling said bus conductors of said first section to said bus conductors of said second section under control of said control means.

4,016,547

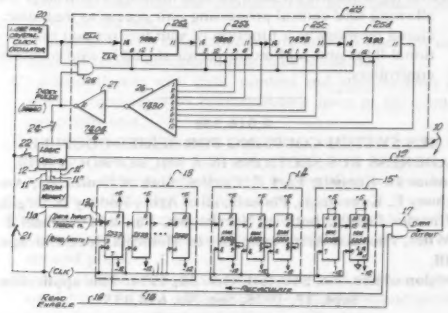
MOS SHIFT REGISTER COMPENSATION SYSTEM FOR DEFECTIVE TRACKS OF DRUM STORAGE SYSTEM

Robert E. Page, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 22, 1976, Ser. No. 651,660

Int. Cl.² G06F *11/00, 13/04*; G11B *5/09*

U.S. Cl. 340—172.5 **7 Claims**



1. An apparatus for compensating for the loss of a damaged data storage track on a rotating drum memory comprising:

means for logically processing data electronically coupled to all tracks on the rotating drum memory and

means for providing a memory for the data otherwise stored on a damaged track of the drum, such data being representative of reading and writing data, clock shift data and an index data to indicate initiation of a cycle the providing means including;

means coupled to the logically processing means for receiving storing and recycling the reading and writing data otherwise to be stored on a damaged reading and writing data track on the rotating drum memory,

means for clocking the data on the receiving means to shift and recycle it through the receiving means, the clocking means is coupled to feed clock pulses to the receiving means and the logically processing means when the clock track is damaged on the rotating drum memory, and

means coupled to the clocking means and the logically processing means for generating an indexing signal and feeding the indexing signal to the logically processing means when an index track is damaged on the rotating drum memory.

4,016,548

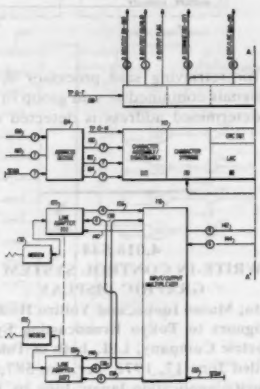
COMMUNICATION MULTIPLEXER MODULE

Wendell A. Law, Kaysville; William G. Barrett, Bountiful; Norman F. Priebe, and Harry D. Wise, both of Salt Lake City, all of Utah, assignors to Sperry Rand Corporation, New York, N.Y.

Filed Apr. 11, 1975, Ser. No. 567,261

Int. Cl.² G06F *3/04, 13/00, 15/20*

U.S. Cl. 340—172.5 **10 Claims**



1. In a communications multiplexer module for transferring data between a data processor and a plurality of line adapters, the combination comprising:

an addressable memory including a plurality of addressable control word location, one location associated with each of said line adapters,

each said control word location including means for storing signals representing a control word having a data character field, an end of character field, and an input/output field;

scanning means for repetitively generating a sequence of addressing signals;

means for applying said addressing signals to said memory to read out and then read back into each of said control word locations;

multiplexer means connected to all said line adapters for receiving data therefrom one bit at a time;

means for applying said addressing signals to said multiplexer means whereby a given line adapter is selected when the control word location associated with said given line adapter is addressed;

time shared logic circuit means connected to said memory and said multiplexer means, said time shared logic circuit means including first circuit means responsive to a first combination of signals representing the input/output field of the control word presently addressed for gating a bit of data from said multiplexer means into the data character field of the control word presently addressed, as it is read back into its control word location;

means in each line adapter producing a data clock signal which is applied to, and gated through said multiplexer means with each data bit;

said time shared logic circuit means including second circuit means responsive to the data clock signal and the end of character field of the control word location being addressed to increment the end of character field,

means for transmitting the incremented end of character

field to said memory for storage when the addressed control word location is read back into;

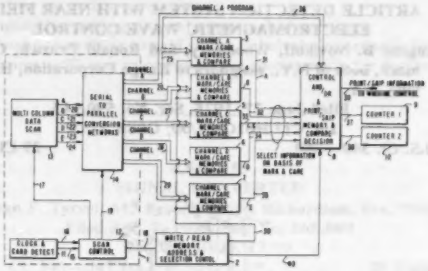
third circuit means in said time shared logic circuit means examining said end of character fields as they are read out of said memory and producing an end of character signal when the end of character field for an addressed control word location indicates that the number of bits of data entered into the data character field of the addressed control word location represents a complete data character; and

means responsive to said end of character signal for transferring said complete data character to said data processor.

4,016,549
SCANNING AND SELECTION METHODS AND APPARATUS THEREFOR

Mark A. Hutner, Glenview, Ill., assignor to Xerox Corporation, New York, N.Y.

Division of Ser. No. 409,679, Oct. 23, 1975, Pat. No. 3,975,715. This application Feb. 3, 1976, Ser. No. 654,899
Int. Cl.² G06F *3/12*
U.S. Cl. 340—172.5 **4 Claims**



1. In an electrophotographic printing system including means for feeding a plurality of records having coded information thereon in succession, photosensitive means adapted for continuous rotation, optical means for imaging document information present on the successively fed records onto said photosensitive means, means for forming a developed electrostatic image on said photosensitive means, selectively actuated image transfer means for selectively transferring a developed electrostatic image onto a transfer member in response to activating signals and control means for activating said selectively actuated image transfer means in response to print selection information, the improvement in apparatus for selecting records which comprises:

memory means for storing coded information representing selection conditions therein and for additionally storing coded information defining a functional operation for each record having coded information thereon to be selected, said coded information defining a functional operation capable of designating at least one of a plurality of output functions for enabling at least a skip function and a selective transfer operation;

means for scanning a plurality of coded data records and producing signals indicative of the bit content of coded information thereon;

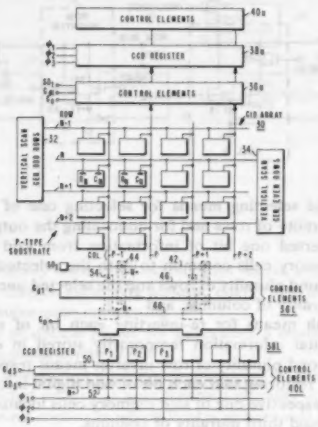
means responsive to signals indicative of the bit content of each of said plurality of coded data records and said selection conditions stored in said memory means for ascertaining whether coded information read from each of said plurality of coded data records scanned is in accordance with coded information representing selection conditions stored in said memory means and providing a selection signal indicative thereof; and

means for transforming selection signals into a functional operational signal in accordance with coded information defining a functional operation stored in said memory means and for supplying any print selection information which results therefrom to said control means to selectively actuate said transfer means at a time when document information from a record which the print selection information was developed is present at said transfer station.

4,016,550
CHARGE TRANSFER READOUT OF CHARGE INJECTION DEVICE ARRAYS

Paul Kessler Weimer, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 24, 1975, Ser. No. 634,447
Int. Cl.² G11C *11/40*
U.S. Cl. 340—173 R **26 Claims**



1. The combination of:

an array of charge injection devices arranged in columns and rows, said array comprising row conductors, column conductors, and charge injection devices, each such device capacitively coupled both to a row conductor and to a column conductor;

means prior to each read interval for resetting the column conductors of said array to a reference potential;

charge transfer register means; and

means responsive to the changes in potential capacitively coupled to said column conductors of said array in response to the application of a read voltage to a row conductor of said array for supplying charge signals, in parallel, to said charge transfer register means indicative of the information signals stored in said row of said array.

4,016,551
DYNAMIC MOS MEMORY WITH REDUCED PROPAGATION DELAY

Richard Aladine Carberry, Sunnyvale, Calif., assignor to Data General Corporation, Southboro, Mass.

Filed Mar. 10, 1976, Ser. No. 665,478
Int. Cl.² G11C *11/40*
U.S. Cl. 340—173 R **5 Claims**

1. A dynamic MOS memory structure comprising:

a planar substrate;

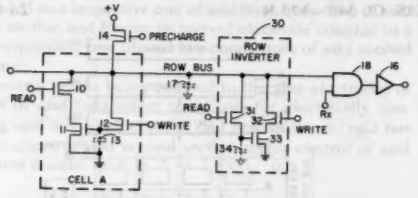
a first plurality of conductively interconnected MOS memory cells, each of said cells being capable of temporarily storing one bit of digital information, said first plurality being arranged in a substantially orthogonal second plurality of rows and third plurality of columns on said planar substrate;

first selecting means for selecting one of said third plurality of columns;

means for writing said digital information into a second plurality of said interconnected memory cells located in said one of said third plurality of columns;

means for simultaneously inverting and reading said digital information from said second plurality of said interconnected memory cells;

a second plurality of row inverter means, each being conductively connected in each of said second plurality of rows respectively to a third plurality of said interconnected memory cells located in said each of said rows and responsive to operation of said inverting and reading means for temporarily storing said inverted digital information;



second selecting means for selecting one of said second plurality of rows and for controlling the outputting of an inverted one bit of information from said one of said memory cells common to both the selected one of said second plurality of rows and the selected one of said third plurality of columns; and

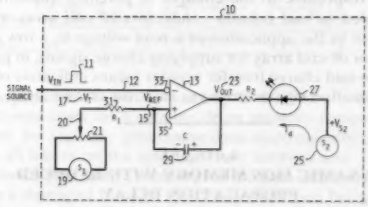
refresh means for re-inverting each bit of said inverted digital information temporarily stored in each of said second plurality of row inverter means respectively, and for restoring said each bit of said digital information into a respective one of said memory cells located in said one of said third plurality of columns.

4,016,552

DUAL POLARITY PULSE DETECTION CIRCUIT WITH VARIABLE VOLTAGE THRESHOLD

James F. Horner, Santa Clara, and William D. Jackson, San Jose, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sept. 12, 1975, Ser. No. 613,008
Int. Cl.² G08B 21/00
U.S. Cl. 340—253 C **5 Claims**



1. A circuit for detecting input signals of of positive and negative polarities and displaying a stretched pulse visibly indicating the occurrence of said input signals relative to a reference signal, said circuit comprising:

threshold signal means for providing a threshold signal;

comparator means having an input, a reference and an output terminal, said input terminal being coupled to receive said input signals and said reference terminal being coupled to receive said threshold signal, the comparator means being effective for detecting the level of each of the input signals relative to the level of said reference signal and for producing at said output terminal an output pulse indicative of the input signal level relative to the reference signal level;

pulse stretching means capacitively coupling said output terminal to said reference terminal for providing capacitive feedback of the output pulse, said capacitively fedback output pulse combining with said threshold signal to form the reference signal, said reference signal being applied to the reference terminal causing the comparator means to produce a stretched output pulse of increased duration in response to the output pulse having a duration shorter than a predetermined value; and

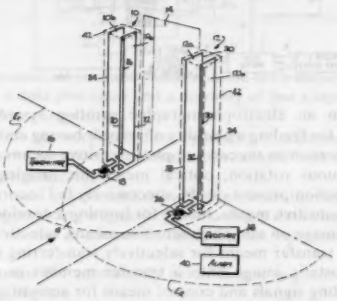
display means coupled to the output terminal of said comparator means for producing discretely visible indications of said stretched output pulse.

4,016,553

ARTICLE DETECTION SYSTEM WITH NEAR FIELD ELECTROMAGNETIC WAVE CONTROL

Eugene B. Novikoff, Woodbury, and Ronald Pruzick, Commack, both of N.Y., assignors to Knogo Corporation, Hicksville, N.Y.

Filed June 27, 1975, Ser. No. 590,913
Int. Cl.² H01Q 21/00; G08B 21/00
U.S. Cl. 340—280 **27 Claims**

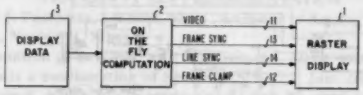


1. Antenna means for an article detection system which includes means forming an egress passageway of predetermined width through which articles to be detected must pass upon leaving a protected area and which further includes an electromagnetic wave transmitter operative to produce electromagnetic wave interrogation signals of predetermined frequency and an electromagnetic wave receiver operative in response to predetermined electromagnetic wave signal disturbances to produce alarm signals, said antenna means including means for coupling same to said transmitter and to said receiver, said antenna means being positioned adjacent said egress passageway, said antenna means further comprising at least one portion connected to at least one of said transmitter and receiver, said one portion being made up of at least two parallel loops connected in bucking relationship and having a length and spacing between them of substantially less than the wavelength of said interrogation signals and of said predetermined electromagnetic wave disturbances each of said loops having a pair of elongated parallel conductors and being connected to direct current flow in different directions in the two conductors, said loops being positioned with some of said conductors located further back away from said passageway than other conductors.

4,016,554
RASTER DISPLAY APPARATUS

Peter John Evans, and Clive Williams, both of Eastleigh, England, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 8, 1976, Ser. No. 647,480
Claims priority, application United Kingdom, July 22, 1975, 30554/75
Int. Cl.² G06K *15/20*; G06F *3/14*
U.S. Cl. 340—324 AD 8 Claims

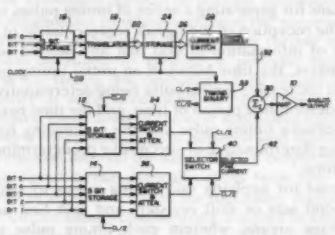


1. Raster display apparatus comprising:
a raster display device;
means for computing line-by-line which points of the raster frame are to be displayed while a raster frame is being displayed;
means for detecting when the time for computation for a line exceeds a given time;
means for issuing a signal upon such detection;
means responsive to said signal to halt the raster scan for a time sufficient to complete the computation for that line.

4,016,555
SIGNAL CONVERTER

Sylvan F. Tyrrel, 443 Beverly Drive, Richardson, Tex. 75080

Filed Apr. 7, 1975, Ser. No. 565,869
Int. Cl.² H03K *13/05*
U.S. Cl. 340—347 DA 29 Claims

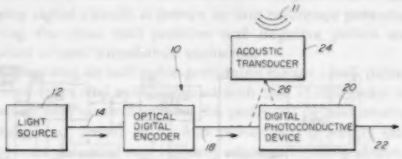


27. A uniformalized digital-to-analog converter, comprising in combination:
a binary-to-binary translator responsive to the most significant bits of an input for generating a binary coded linear scale output,
a first current select switch responsive to the binary coded linear scale output of said translator and producing a current output varying with the input,
a second current switch responsive to the least significant bits of the input and generating a current output varying with the input thereto,
a third current switch also responsive to the least significant bits of the input and generating a current output varying with the input thereto,
a current select switch having one input from said second current switch and a second input from said third current switch for alternately coupling one of the input currents to an output of said current select switch, and
means for summing the current output of said first current switch with the current output of the current select switch into a total current varying with the most significant and least significant bits of the input.

4,016,556
OPTICALLY ENCODED ACOUSTIC TO DIGITAL TRANSDUCER

John E. Fulenwider, Concord, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Mar. 31, 1975, Ser. No. 563,868
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 P 13 Claims

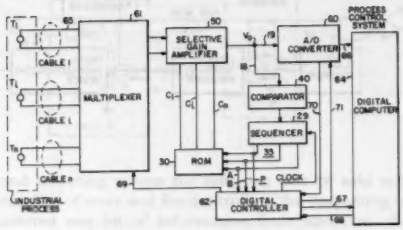


1. An optically encoded transducer for use in a telephone handset for converting analog acoustic energy into an electrical digital pulse code comprising:
a. source of optical power for generating a beam of light along a predetermined path,
b. means disposed in the path for encoding the beam into a preselected pattern of light having a plurality of rows of alternating regions in which light is present and in which light is absent, the areas of the regions in the respective rows being related by factors of two to define a binary weighted relationship between the rows of regions,
c. an array of thin film photoconductive elements, having a plurality of rows of spaced photoconductive elements, the areas of the elements in the respective rows being related by factors of two to define a binary weighted relationship between the rows of elements, the array being disposed in the path of encoded beam such that a row of regions impinges upon a defined row of photoconductive elements, the shapes and areas of corresponding regions and elements in rows of the array and the encoded beam being substantially equal as the encoded beam impinges the array, the photoconductive elements of each row being electrically interconnected and generating a value of resistance which is related to the relative position of the light containing regions with respect to the photoconductive elements,
d. the number of photoconductive elements in any row except that having the greatest binary weighted value being twice the number of light containing regions in a corresponding row of the encoded beam so that the resistance of each row varies between a first level in which all elements are not exposed to light and a second level where one-half the elements are exposed to light,
e. means responsive to the acoustic energy for effecting relative motion between the array and the encoded beam in a direction parallel to the rows to vary the resistance of each row of elements between the first and second levels, and
f. means for establishing a threshold level between the first and second levels and for generating first and second digital voltages for each of the plurality of rows of photoconductive elements depending upon whether the resistance level is above or below the threshold level.

4,016,557
AUTOMATIC GAIN CONTROLLED AMPLIFIER APPARATUS

William E. Zitelli, Media, and Andras I. Szabo, Export, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 8, 1975, Ser. No. 575,679
Int. Cl.² H03K 13/02; H03G 3/00
U.S. Cl. 340—347 AD 2 Claims



1. In a data acquisition system including a central computer and at least one remote station comprising one multiplexer connected to a plurality of points for deriving input analog signals of different amplitude ranges, an analog-to-digital converter associated with said multiplexer for providing digital data representative of said intput analog signals and means for controlling said multiplexer and analog-to-digital converter in relation to said points severally, the combination of:

adjustable gain amplifier means in said station responsive to said input analog signals as derived from said multiplexer for supplying amplified input signals to said converter;

said amplifier means including a plurality of elemental circuits each contributing at least in part to one of a plurality of definite gain settings thereof;

switching means in said station for operatively connecting a selection of said elemental circuits to establish one of said gain settings;

programmable logic memory means in said station for controlling said switching means to establish successive gain settings in accordance with a plurality of sequence instructions;

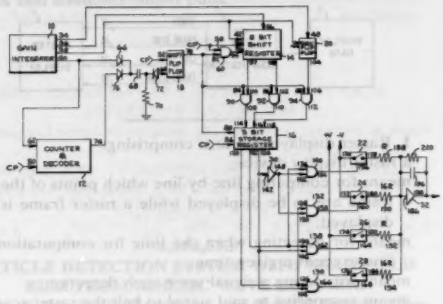
sequencer means in said station for applying to said memory means a plurality of said sequence instructions, said sequence instructions corresponding to a succession of said gain settings representing a monotonic succession of gains;

the operation of said sequencer means being initiated by said control means and gated by out-of-range condition of said amplifier means and being terminated in response to an in-range condition of said amplifier means, whereby said amplifier means automatically supplies to said converter amplified input signals of effective amplitude, said control means being adapted to transmit from said remote station to said central computer said input analog signal representative digital data and digital address data identifying the multiplexed input signals of said remote station and digitally coded data from said sequencer means characterizing the associated operative gain setting of said amplifier means in said remote station.

4,016,558
APPARATUS FOR CONVERTING A PLURALITY OF SIGNALS REPRESENTATIVE OF DIGITAL BITS OF INFORMATION TO AN ANALOG SIGNAL

Everett Reece Bishop, and Marcel Henri Leroux, both of Waynesboro, Va., assignors to General Electric Company, New York, N.Y.

Filed June 27, 1975, Ser. No. 590,940
Int. Cl.² H03K 13/00
U.S. Cl. 340—347 DA 10 Claims



1. Apparatus for converting a plurality of signals representative of digital bits of information to an analog signal comprising:

a. first and second sets of shift registers for receiving the signals representative of the digital bits of information, each of said sets including a plurality of stages, wherein the last stage of each of said sets stores a signal representative of the least significant bit remaining within its respective set;

b. at least first and second switch means;

c. first and second storage means;

d. means for generating a series of timing pulses subsequent to the reception of the signals representative of the digital bits of information in said first and second sets of shift registers, the time between an initial timing pulse and a next successive timing pulse being determinative of a first predetermined period of time, and the time between each successive timing pulse and the preceeding timing pulse being determinative of successive predetermined periods of time;

e. means for applying said timing pulses to said first and second sets of shift registers and said first and second storage means, wherein each timing pulse effects the advance of the signals representative of digital bits of information left within stages other than the last stage of each set toward the respective last stage, and also effects the transfer of signals representative of the least significant bit of information left within each respective last stage of said respective first and second storage means to be stored therewithin for the respective predetermined period of time, the duration of each of the predetermined periods of time corresponding to the count of the higher order of the signals representative of the two particular bits being transferred to said respective first and second storage means;

f. means for coupling signals representative of each of successive pairs of bits of information from said first and second storage means to said first and second respective switch means to control the operation thereof for the respective predetermined periods of time;

g. an integrator; and

h. means for repetitively applying first and second signals to said integrator at respective magnitudes corresponding to the ratio between the count of each of the two bits represented by the signals being simultaneously transferred from said respective last stages of said first and second

sets of shift registers at one moment, and for a duration controlled by the operation of said first and second switch means, whereby an analog signal is obtained from the output of said integrator, which analog signal is equal to the sum of the products of the magnitude of the signals applied to said integrator and the respective predetermined periods of time.

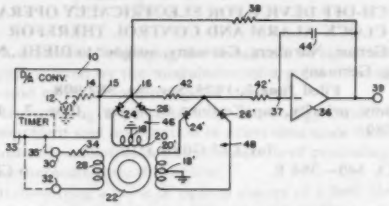
4,016,559
DIGITAL-TO-ANALOG CONVERTER HAVING TRANSIENT SUPPRESSOR SYSTEM

James J. Pastoriza, Lincoln, Mass., assignor to Analog Devices, Inc., Norwood, Mass.

Continuation of Ser. No. 442,734, Feb. 15, 1974, abandoned, which is a continuation of Ser. No. 219,477, Jan. 20, 1972, abandoned, which is a continuation of Ser. No. 885,110, Dec. 15, 1969, abandoned. This application Jan. 8, 1976, Ser. No. 647,431

Int. Cl.² H03K *13/02*

U.S. Cl. 340—347 DA **7 Claims**



4. A digital-to-analog converter including a plurality of current-sources selectable by corresponding control switches individually activatable in accordance with the states of the respective binary bits of digital input words applied successively to said converter, the currents from the selected current sources being conductively connected to an analog signal circuit to be combined thereon to provide successive analog signals the magnitudes of which represent the successive digital input words respectively, said converter further including timing means arranged to provide a periodic momentary strobe pulse for timing the operation of all of said switches simultaneously at successive times to effect the transitions from one digital input word to the next successive digital input word, during a short time interval between said digital words, at which transition interval the magnitude of output current at said analog signal circuit typically shifts from one level to another level in accordance with the successive digital words; and output circuit means conductively coupled to said analog signal circuit for producing an output voltage corresponding to the magnitude of the current developed at said analog signal circuit;

transient suppressor apparatus responsive to and synchronized with said strobe pulse for preventing unwanted transient signals, such as voltage spikes due to asymmetries and/or effective non-simultaneity of operation of said current source switches, from causing corresponding unwanted signals in the output voltage produced by said output circuit means, said transient suppressor apparatus comprising:

a clamp circuit including first and second identical elements each having a pair of connection terminals, said element each comprising means developing between the respective pairs of terminals an electrical impedance which varies from a relatively large value, when there is no voltage across the pair of terminals and thus no conduction through said elements, to a relatively small value when there is applied across the pair of terminals a voltage of a predetermined magnitude;

means conductively connecting one terminal of each of said clamp circuit elements to said analog signal circuit;

said clamp circuit elements being normally non-conducting so that the clamp circuit does not affect the output current on said analog signal circuit;

pulse-producing means having a pair of output points and arranged when activated by a control pulse to develop between said output points and a common reference point respective pulses of positive and negative voltage of said predetermined magnitude with respect to said common reference point;

means connecting said output points respectively to the other terminals of said pairs of impedance element terminals to apply said pulse of positive and negative voltage respectively across said impedance elements, the impedances of said impedance elements with said pulse voltages applied being such that the potential of the common connection of said elements, and thus the potential of said analog signal circuit, is driven to said reference potential during the time said positive and negative pulses are applied to said impedance elements;

means directing to said pulse-producing means clock pulses derived from and synchronized with said strobe pulse to serve as said control pulses, the potential of said analog signal circuit during each clock pulse being driven to said reference potential and said impedance elements absorbing unwanted transient currents from said analog signal circuit during the time of said clock pulse;

said output circuit means including amplifier means having an input terminal conductively coupled to said analog signal circuit and an output for producing said output voltage corresponding to current directed from said analog signal circuit to said amplifier input terminal; and

memory means coupled to the output of said amplifier to hold the output signal effectively constant during the time of said clock pulse to provide for a smooth transition from one digital word to the next digital word while the potential of said analog signal circuit is driven to said reference potential to absorb unwanted transient current therefrom.

6. Apparatus as claimed in claim **4**, wherein said memory means comprises capacitor means connected in a negative feedback circuit between the output and the input terminal of said amplifier; and

resistive means between said analog signal circuit and said amplifier input terminal to cooperate with said capacitor means to provide an integration effect permitting momentary transistory shift of the potential of said analog signal circuit to said reference potential without significant change in the output signal from said amplifier.

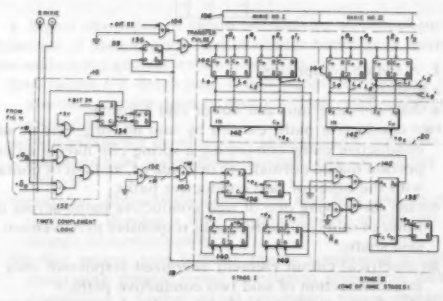
4,016,560
FRACTIONAL BINARY TO DECIMAL CONVERTER

Robert W. Fowler, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 9, 1976, Ser. No. 665,217

Int. Cl.² G06F *5/00*

U.S. Cl. 340—347 DD **10 Claims**



1. An apparatus for converting an *n*-bit binary fraction word into a word in decimal form comprising:

a read-in line on which the *n* bits of a binary fraction word are carried,

means for generating a word pulse during the *n* bits of alternating word-times,

means connected to the word pulse generator for shifting the word pulse two bits in the direction of higher significance, thereby generating a shifted pulse,

a first stage having the binary fraction word on the read-in line as an input,

a series of successive stages, connected to and in seriatim following the first stage, each successive stage having as an input a remaining binary fraction generated by its preceding stage, wherein the first stage and each successive stage comprises:

means for ANDING the input of each stage with the generated word pulse from the word-pulse generating means thereby producing a first gate input,

means for shifting the input two bits in the direction of higher significance, thereby generating a shifted input,

means for ANDing the shifted input of each stage with the shifted word pulse, thereby producing a second gate-input,

means for summing the first gate-input and the second gate-input thereby producing a summed output,

means for shifting the summed output two bits in the direction of higher significance, thereby generating the input for the next successive stage, and

means for grouping together the four most significant bits of each generated input as a binary-coded decimal, and

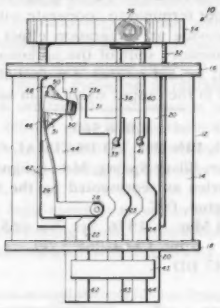
means for ordering the binary-coded decimals in decreasing significance for successive stages.

4,016,561

PUSH BUTTON SWITCH WITH INDICATOR

Ralph L. Parker, Melbourne Beach, and Daniel B. Hoskins, Maitland, both of Fla., assignors to TRW Inc., Los Angeles, Calif.

Filed June 28, 1974, Ser. No. 484,062
Int. Cl.² G09F 9/14
U.S. Cl. 340—381 **10 Claims**



1. A switch comprising:

a housing;

a shaft movable into and out of said housing;

two conductive paths carried by said housing, one of said conductive paths comprising a spring clip having an end portion biased normally to one side of, and out of contact with the other of said conductive paths;

means for moving one of said conductive paths across the other of said conductive paths responsive to movement of said shaft;

an electrical circuit element energized responsive only to interconnection of said two conductive paths;

means for maintaining said circuit element energized for a period of time independent of said movement of said shaft;

means for preventing movement of said one conductive path across the other of said conductive paths during movement of said shaft out of said housing, this means comprising a cam carried by said shaft, said cam including;

a straight shoulder substantially parallel with said shaft for holding said spring clip away from said other conductive path such that said end portion thereof is held on a side of said other conductive path opposite said one side during engagement with said shoulder;

said conductive path interconnecting means including a tip along said shoulder for releasing said clip whereby said end portion moves along said other conductive path to said one side thereof;

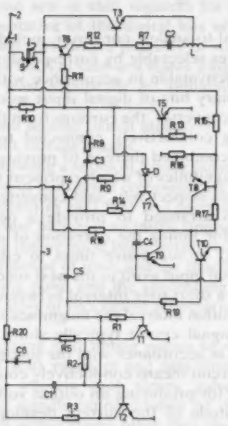
a beveled surface for camming said end portion out of contact with said other conductive path during movement of said shaft out of said housing; and wherein said spring clip includes means for engaging said cam during movement of said shaft into and out of said housing.

4,016,562

SWITCH-OFF DEVICE FOR ELECTRICALLY OPERATED CLOCK ALARM AND CONTROL THEREFOR

Erich Gerum, Nurnberg, Germany, assignor to DIEHL, Nurnberg, Germany

Filed June 2, 1975, Ser. No. 582,908
Claims priority, application Germany, June 7, 1974, 2427589
Int. Cl.² G08B 3/10
U.S. Cl. 340—384 E **6 Claims**

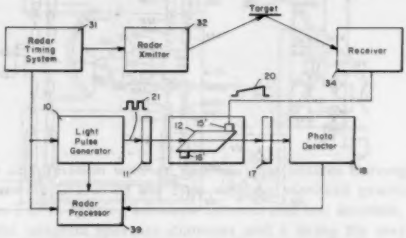


1. In an electrically operable alarm for a clock having first and second switches as well as a source of power therewith; an oscillatory circuit activatable by the first switch of the clock at a selectable time and operable when oscillating to cause the alarm to sound, a bistable switching sweep circuit having at least one branch and connected between one side of the source of electric power and said oscillatory circuit and having a first condition in which said oscillatory circuit is operable to oscillate when the first switch is closed and having a second condition in which said oscillatory circuit does not oscillate in response of the operation of the second switch, the improvement therewith comprising in combination: the second switch being connected in one branch of said bistable switching sweep circuit, means for momentarily opening said second switch causing said bistable switching circuit to go to said second condition and to stay in said condition until the first switch is opened and further means for permanently opening said second switch causing said bistable switching sweep circuit to stay in said second condition when said first switch is closed.

4,016,563
METHOD AND APPARATUS FOR ACOUSTO-OPTIC PULSE COMPRESSION

Melvin E. Pedinoff, Canoga Park, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed May 27, 1975, Ser. No. 581,398
Int. Cl.² G01S 9/00; G06G 7/19
U.S. Cl. 343—5 SA **16 Claims**



1. A method of changing the time scale of signal information represented by the modulation of a pulse of carrier energy, said method comprising the steps of:

a. transmitting a pulse of acoustic energy modulated to represent said information in a first time scale through an optically anisotropic medium capable of producing colinear acousto-optic diffraction;

b. transmitting a pulse of optical energy of a first predetermined polarization state through said medium colinearly with said pulse of acoustic energy while said acoustic pulse is in said medium to interact therewith in said medium to diffract said light pulse from said first polarization state to a second polarization state during the time interval of said interaction;

c. detecting only the light pulse emitted from said medium in said second polarization state to detect said signal information in a second time scale; and

d. controlling the relationship between the time duration of said pulse of acoustic energy and the time duration of said pulse of optical energy of said first predetermined polarization state to produce a predetermined relationship between said first and second time scales of said signal information as a function of said controlled relationship between said time durations of said pulses and of the relationship between the respective velocities of said acoustic and optical pulses.

4,016,564
MULTIPLE TARGET DATA RECEIVER FOR A COLLISION AVOIDANCE SYSTEM

Walter Lee Ross, Simi Valley, Calif., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,479
Claims priority, application United Kingdom, Apr. 14, 1975, 15221/75
Int. Cl.² G01S 9/56
U.S. Cl. 343—6.5 LC **5 Claims**

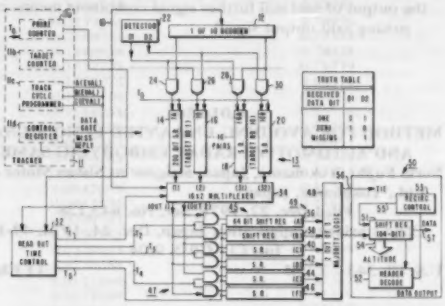
1. In combination,

means for receiving reply signals generated by remote stations in response to probe signals from interrogating stations, said reply signals being adapted to be received in an environment wherein signals of a type different from said reply signals may be received, all of said received signals being of predetermined duration and having a characteristic indicia of either a binary logic value of one or zero,

means for detecting said received signals and generating therefrom digital signals representing a binary bit corresponding to said logic value,

means for sampling said digital signals and generating therefrom a plurality of sampled signals, each sampled signal having a duration substantially less than said predetermined duration, and

means for comparing the relative duration of sampled signals of one logic value with that of sampled signals of the opposite value to generate a multi-bit digital output signal

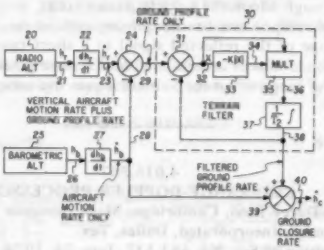


manifesting a first or second binary logic value, which corresponds to that of a valid received reply signal, in accordance with the longer of said compared sampled signals or manifesting a third binary logic value, which corresponds to the absence of a valid received reply signal, when the duration of said compared sampled signals is equal.

4,016,565
AIRCRAFT GROUND CLOSURE RATE FILTERING METHOD AND MEANS

Ferman L. Walker, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 15, 1975, Ser. No. 613,380
Int. Cl.² G01S 9/04; G06F 15/50
U.S. Cl. 343—7 TA **8 Claims**



1. Signal development means for deriving an output signal definitive of the elevation rate of change between an aircraft and underlying ground terrain comprising:

first means for developing a first signal definitive of the absolute closure rate between aircraft and underlying ground terrain,

second means for developing a second signal definitive of barometrically determined aircraft rate of change of altitude,

means for subtractively combining said first and second signals to develop a third signal definitive of the rate of change of terrain profile,

filtering means; said filtering means comprising a signal integrating means, signal correlation responsive means comprising a further signal combining means receiving said third signal and the output of said signal integrating means as respective inputs thereto and responsive to an exponential correlation therebetween to provide a corre-

lation defined output signal, said correlation defined output signal being applied as input to said signal integrating means;

the output of said signal integrating means comprising the output of said filtering means; still further signal combining means additively combining said second signal and said output of said filtering means; and

the output of said still further signal combining means comprising said output signal.

4,016,566

METHOD FOR AVOIDING UNWANTED ECHO SIGNALS AND AUTOMOTIVE RADAR EMBODYING SAME

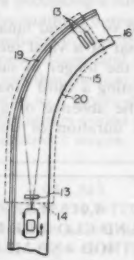
Norio Fujiki, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 22, 1975, Ser. No. 643,128

Claims priority, application Japan, Dec. 24, 1974, 49-1561

Int. Cl.² G01S 9/04

U.S. Cl. 343—7 VM **11 Claims**



4. A radar system mounted on a motor vehicle for detecting the presence of an object in front of the vehicle, comprising:

means for transmitting a beam of electromagnetic radiation;

means for receiving a signal reflected from the object;

means for sensing the presence of a predetermined zone through which the vehicle passes; and

means responsive to the sensing means for limiting the range of the reflected signal to a short range when the vehicle moves in said zone and restoring said range to a long range when the vehicle leaves the zone.

4,016,567

CCD RANGE-DOPPLER PROCESSOR

Dennis Darcy Buss, Cambridge, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 483,337, June 24, 1974, Pat. No. 3,942,035. This application Nov. 6, 1975, Ser. No. 629,246

Int. Cl.² G01S 9/42

U.S. Cl. 343—7.7 **13 Claims**

1. Doppler range processing apparatus including means for premultiplying time sampled radar signal returns to provide up-chirp multiplication of said time sampled signals;

charge transfer device shift register means having *N* storage bits for storing respective up-chirp weighted samples of said radar return signals occuring during a pulse repetition interval;

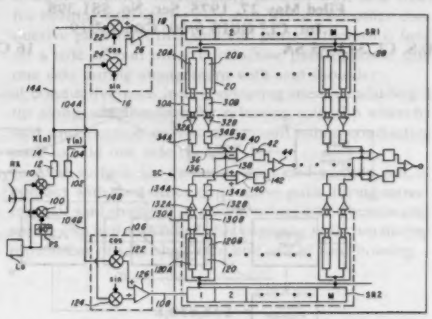
for each bit of said shift register means, first and second charge transfer device chirp Z-transform filters;

transfer means for transferring signals stored in the bits of said shift register as inputs to the respective first and second chirp filters for each respective bit;

said first chirp filters being adapted to provide in-phase weighting of said input signals thereto;

said second chirp filters being adapted to provide quadrature-phase weighting of said input signals thereto;

means connecting said filter outputs to means for summing



and squaring weighted signal outputs from said filters.

4,016,568

METHOD AND SYSTEM FOR MEASURING DOPPLER FREQUENCY SHIFT OF AN ECHO

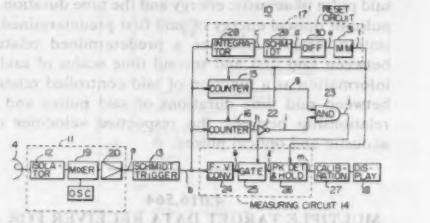
Mistuo Makimoto; Sadahiko Yamashita, both of Kawasaki; Yoshiharu Yano, and Junichi Yamamoto, both of Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Dec. 31, 1974, Ser. No. 537,767

Claims priority, application Japan, Jan. 18, 1974, 49-8896

Int. Cl.² G01S 9/44

U.S. Cl. 343—8 **10 Claims**



1. A method of measuring a velocity of a moving object, comprising the steps of:

transmitting a diverging beam of electromagnetic radiation in a direction so that the moving object traverses the beam of electromagnetic radiation;

receiving electromagnetic radiation reflected from the moving object, which electromagnetic radiation has an instantaneous Doppler frequency component that varies in frequency as a function of time as the moving object traverses the beam of electromagnetic radiation;

detecting the Doppler frequency component of the reflected electromagnetic radiation to develop an oscillatory Doppler signal oscillating at the Doppler frequency;

counting a predetermined number of the oscillations of the Doppler signal after the Doppler frequency component is first detected; and

detecting the maximum frequency of the Doppler oscillations which occur after the predetermined number of Doppler oscillations have been counted, which maximum frequency is representative of a velocity of the moving object.

4,016,569
NEAR FIELD ANTENNA BORESIGHT ALIGNMENT APPARATUS

Edgar W. Buebel, Jr., Cockeysville, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 3, 1975, Ser. No. 619,152
Int. Cl.² G01R *29/10*
U.S. Cl. 343—703 **1 Claim**

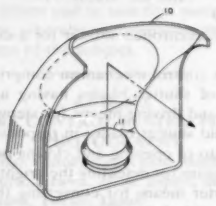
1. In combination with an antenna that utilizes boresight alignment apparatus of the type wherein standard practice requires 2 D^2/λ spacing between antenna and test antenna, D being the antenna aperture diameter and λ being the wavelength of the antenna operating frequency, the improvement wherein the spacing between antenna and test antenna is reduced while achieving the same results as standard practice apparatus said improvement comprising

a test antenna having an aperture approximately 20 percent greater than the aperture of said antenna, said test antenna being positioned to receive radiation transmitted by said antenna at a distance therefrom of approximately 0.15 D^2/λ.

4,016,570
CONSTANT BEAM WIDTH ANTENNA REFLECTOR

Kenneth D. Arkind, Groton, Mass., and Bernard L. Geddry, Nashua, N.H., assignors to Sanders Associates, Inc., Nashua, N.H.

Filed Feb. 5, 1976, Ser. No. 655,344
Int. Cl.² H01Q *19/12*
U.S. Cl. 343—781 R **8 Claims**



1. An antenna reflector surface described by a first curve derived by multiplying each of the cartesian coordinate defined points listed below by the focal length in inches of the reflector

TABLE 12

X	Y
1.2208106 inches	1.37520 inches
1.1505312	1.36100
1.0814748	1.34218
1.0150528	1.32120
0.9515473	1.29862
0.8907702	1.27472
0.8329097	1.24979
0.7777775	1.22401
0.7253737	1.19748
0.6756042	1.17029
0.6282809	1.14262
0.5834978	1.11459
0.5409726	1.08618
0.5007995	1.05758
0.4627903	1.02879
0.4268509	1.00000

TABLE 12-continued

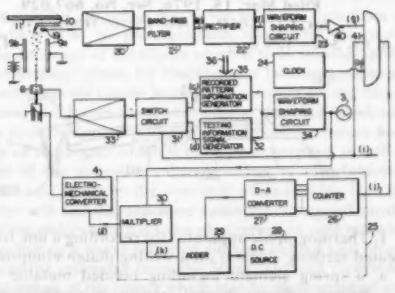
X	Y
0.3928872	0.97102
0.3609934	0.94214
0.330887	0.91335
0.3024742	0.88465
0.275849	0.85615
0.2509172	0.82783
0.2273966	0.79970
0.2054755	0.77194
0.1849656	0.74438
0.1657728	0.71719
0.1478972	0.69038
0.1312446	0.66384
0.1158151	0.63778
0.1014206	0.61200
0.0882491	0.58651
0.0760184	0.56148
0.0648226	0.53674
0.0545676	0.51238
0.0453476	0.48829
0.0369743	0.46467
0.0294477	0.44134
0.0228619	0.41838
0.0170288	0.39571
0.0121366	0.37341
0.0079969	0.35149
0.0047041	0.32985
0.0022579	0.30850
0.0006585	0.28742
0.0003763	0.26672
0	0.24621

where the focal length of the reflector is the distance in inches from a feed illuminating said reflector to the central point of said first curve and the remainder of the reflector surface is described by a family of curves, each curve lying in its own planar surface, with the physical center of each of the family of curves coinciding with a point on said first curve and the planar surfaces containing each of the family of curves orthogonal to the plane containing said first curve and said antenna reflector surface providing constant elevation beam width for any frequency of radiation illuminating said reflector surface.

4,016,571
INK JET RECORDING APPARATUS

Takahiro Yamada, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Sept. 12, 1975, Ser. No. 612,960
Claims priority, application Japan, Sept. 17, 1974, 49-106080
Int. Cl.² G01D *18/00*
U.S. Cl. 346—75 **8 Claims**



1. In a recording apparatus of the ink jet type including a high frequency voltage source, nozzle means supplied with ink under pressure for generating an ink stream along a predetermined path, and electro-mechanical converter means for vibrating said nozzle means to cause said ink stream to break up into a stream of regularly spaced ink droplets, a system for control of said ink droplets comprising:

first circuit means for applying to said electro-mechanical converter a voltage for vibrating said nozzle means in synchronism with the output voltage of said high frequency voltage source so as to cause said ink stream to break up into ink droplets of larger and smaller size;

a charging electrode disposed along said predetermined path at the point of separation of said droplets from said ink stream for inducing an electrical charge in said droplets;

deflection means disposed along said predetermined path downstream of said charging electrode for providing a constant electrostatic field across said predetermined path to cause deflection of said droplets to a degree depending on the electrical charge induced therein;

second circuit means for generating a recording information signal voltage of square waveform whose center is in synchronism with a predetermined phase of the output voltage of said high frequency voltage source and whose amplitude is equivalent to the charge required to impart a desired amount of deflection to a droplet in said deflection electrostatic field;

third circuit means for generating a test information signal voltage having a narrower square waveform than said recording information signal voltage and being in synchronism with the output voltage of said high frequency voltage source so as to impart a predetermined charge to said ink droplets and occur only in synchronism with the generation of said droplets of smaller size;

switching means for selectively connecting the outputs of said second and third circuit means to said charging electrodes at different time periods;

catcher means disposed along said predetermined path downstream of said deflection means to intercept ink droplets which have no induced electrical charge;

detector means for detecting said ink droplets of smaller size properly charged by the voltage of said test information signal voltage;

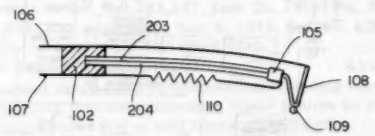
decision circuit means responsive to the output of said detector means for determining whether said ink droplets of smaller size are properly produced and charged by the voltage of said test information signal; and

correction circuit means responsive to the output of said decision circuit means for controlling the magnitude of the output voltage of said first circuit means to adjust the point of droplet separation from said ink stream.

4,016,572
THERMOGRAPHIC STYLUS WITH INHERENT PRESSURE CONTROL

James R. Hubbard, Moorestown, N.J., assignor to Graphic Controls Corporation, Buffalo, N.Y.

Filed Mar. 15, 1976, Ser. No. 667,029
Int. Cl.² G01D *15/16, 15/10;* **H05B** *1/00*
U.S. Cl. 346—139 C **13 Claims**



1. Thermographic apparatus for recording a line traced by a heated scribing element on a writing platen comprising:

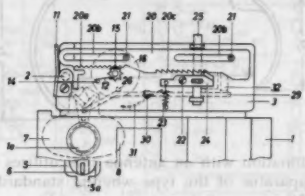
a. a spring element including bonded metallic members having different thermal expansion coefficients and extending between a mounting block and said scribing element; and

b. heating means, adapted to heat said spring and connected to an electrical circuit, said spring element and said heating means being adapted to vary the pressure of said scribing element against said platen by changes of power input to said circuit.

4,016,573
SHUTTER CONTROL FOR PHOTOGRAPHIC CAMERA APPARATUS

Dieter Mücke, Wildbad, Germany, assignor to Prontor-Werk, Alfred Gauthier GmbH, Postfach, Germany

Filed Sept. 8, 1975, Ser. No. 610,961
Claims priority, application Germany, Sept. 7, 1974, 2442939
Int. Cl.² G03B *7/14, 9/00*
U.S. Cl. 354—26 **9 Claims**



1. A driving device for an automatic time aperture shutter, the opening system of which, covering the exposure opening, is movable from the closed to the open position by means of a spring drive and interposed movable masses having a relatively low speed, the spring drive of the opening system including a relatively strong spring adequate for overcoming the inertia of masses to be accelerated and coming into effect only during the initial movement phase of these masses, and a further relatively weak spring which provides a substantially uniform movement of the masses to be accelerated and acts continuously thereon.

4,016,574
PROGRAM-CONTROLLED SHUTTER

Hiroshi Iwata, Osaka, and Katsuji Ishikawa, Daito, both of Japan, assignors to West Electric Company, Ltd., Japan

Filed Apr. 17, 1975, Ser. No. 569,006
Claims priority, application Japan, Apr. 23, 1974, 49-46280
Int. Cl.² G03B *7/14*
U.S. Cl. 354—29 **19 Claims**

13. A program controlled shutter for a camera lens comprisng

a. an exposure control mechanism comprising

a plurality of shutter blades having aperture defining portions, and driving means for stepwise opening and closing said shutter blades in response to the application thereto of opening and closing pulse signals;

b. photocell means for detecting the brightness of a subject;

c. first converter means for converting the analog output signal from said photocell means into a digital signal;

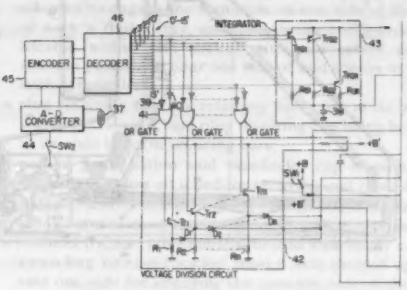
d. second converter means for converting the output from said first converter means into a binary coded decimal signal;

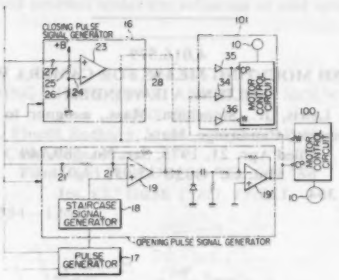
e. third converter means connected to said second converter means and provided with a plurality of output terminals said third converter means comprising means for generating, in response to binary coded decimal signals from said second converter, an output signal which appears selectively at one output terminal of said plurality of output terminals, said third converter means providing said output signal continuously;

f. opening pulse signal generating means for generating said opening pulse signal in response to said output signal from said third converter means and for applying said opeing pulse signal to said driving means, thereby opening said shutter blades so as to stop down the camera lens to a determined *f*-number depending upon the brightness of the subject;

g. closing pulse signal generating means operating independently of said opening pulse signal generating means for generating said closing pulse signal in response to said

output signal from said third converter means and for applying said closing pulse signal to said driving means, thereby closing said shutter blades after a determined exposure time depending upon the brightness of the subject;



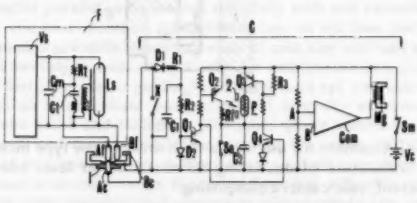


h. power supply means for supplying power to said exposure control mechanism, said opening and closing pulse signal generating means and to said first second and third converter means; whereby said exposure time depends upon the brightness of the subject.

4,016,575
EXPOSURE CONTROL SYSTEM FOR FLASH PHOTOGRAPHY

Takashi Uchiyama, Yokohama; Yukio Mashimo, Tokyo, and Zenzo Nakamura, Urawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 31, 1975, Ser. No. 563,463
Claims priority, application Japan, Apr. 3, 1974, 49-37645; July 15, 1974, 49-80841
Int. Cl.² G03B 7/16, 15/03
U.S. Cl. 354—33 **32 Claims**



1. An exposure control system for a photographic apparatus comprising:

A. an electronic flash device;

B. electrical energy storing means for flash illumination;

C. means for causing the electrical energy of said storing means to be discharged through said flash device, thereby a photographic subject is illuminated with flash light from said flash device;

D. detecting means connected to said storing means for detecting the attainment of a predetermined voltage developed by said stored charge of said storing means as the critical level for assuring the firing of said flash device;

E. shutter means for unblocking and blocking an exposure aperture to establish an exposure interval;

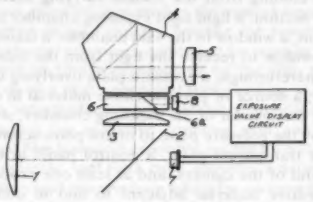
F. shutter adjusting means operatively connected to said shutter means for adjusting said shutter means to one of at least two settings of different exposure interval, said possible settings providing corresponding exposure intervals including one suited for taking photographs with flash illumination from said firing flash device and one not suited for making an exposure in flash mode but for use in daylight photography;

G. automatic changeover means responsive to an output signal of said detecting means and associated with said shutter adjusting means for selectively switching said adjusting means to an operative condition providing said flash exposure interval automatically in response to attainment of the voltage of said storing means to said critical voltage level of said flash device, whereby said shutter means is adjusted to the setting providing said flash exposure interval.

4,016,576
EXPOSURE VALUE DISPLAY FOR CAMERAS

Katsuhiko Nomura, Kawagoe, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan

Filed July 8, 1975, Ser. No. 593,974
Claims priority, application Japan, July 12, 1974, 49-81542
Int. Cl.² G03B 17/20
U.S. Cl. 354—55 **4 Claims**



1. In a camera, objective means for receiving light from an object which is to be photographed, viewfinder means for providing an image of the object which is to be photographed, luminous display means for displaying a luminous exposure value, and reflector means having with respect to said objective means, said luminous display means, and said viewfinder means a position for reflecting to said viewfinder means both an image of the object which is to be photographed as well as an image of the exposure value provided by said luminous display means, whereby the operator when looking into the viewfinder will see the exposure value superimposed on the image of the object which is to be photographed, said reflector means including a lower reflector situated behind said objective means for reflecting from the latter into said viewfinder means an image of the object which is to be photographed and an upper reflector situated higher than said lower reflector but beneath said viewfinder means with said luminous display means being situated at the same elevation as said upper reflector for directing to the latter light from the luminous exposure value, and said upper reflector directing into said viewfinder means an image of said luminous display value, said upper reflector being situated between said lower reflector and said viewfinder means, a focusing means being situ-

ated between said upper and lower reflectors for receiving from said lower reflector an image of the object to be photographed and for focusing said image with respect to said viewfinder means, said upper reflector being situated between said focusing means and said viewfinder means and being in the form of a semi-transparent reflector for reflecting light from said luminous display means as well as for providing for passage of light from said focusing means to said viewfinder means.

4,016,577

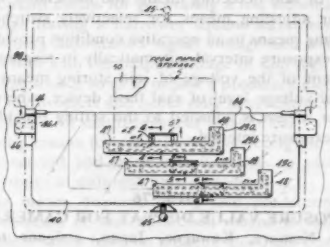
PHOTOPRINTING AND PROCESSING DEVICE

Philip E. Hensy, Plantation, and Morey R. Zuber, Fort Lauderdale, both of Fla., assignors to Visual Graphics Corporation, Tamarack, Fla.

Filed July 7, 1975, Ser. No. 593,879

Int. Cl.² G03B *29/00, 27/58*

U.S. Cl. 354—78 **9 Claims**



1. A combined camera and processing device comprising an elongated base, an indicia carrying section at one end of said base, an exposing section at the other end of the base, a light source for the indicia carrying section, optical means to direct the light coming from the indicia carrying section into the exposing section, a light tight exposing chamber in the exposing section, a window in the said chamber, a transparent plate in said window to receive the light from the indicia carrying section therethrough, a pressure plate overlying the transparent plate, a source of photosensitive material in communication with the interior of the exposing chamber, stop members carried by the pressure plate to orient photosensitive material upon the transparent plate, a control panel at the exposing section end of the camera, and at least one processor for the photosensitive material adjacent to and in communication with the interior of the exposure chamber to receive and process exposed photosenstive material.

4,016,578

PROCESSING FLUID FLOW CONTROL DEVICE FOR SELF DEVELOPING CAMERA

Harvey S. Friedman, Natick, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 13, 1976, Ser. No. 648,672

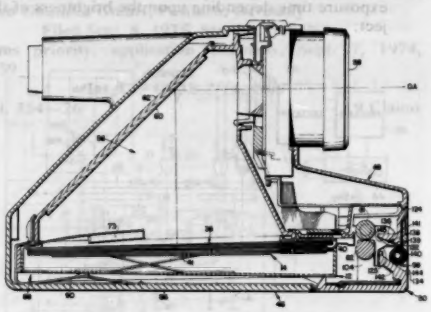
Int. Cl.² G03B *17/50*

U.S. Cl. 354—86 **20 Claims**

1. Photographic apparatus comprising:

means for spreading a mass of fluid in a substantially thin layer between a pair of sheet materials, said fluid spreading means including a pair of elongated juxtaposed pressure-applying members between which the sheet materials may be advanced in superposed relationship; and

means for reducing the thickness of the layer of fluid spread between the superposed sheet materials by said fluid spreading means in the vicinity of both opposed longitudinal edges of the superposed sheet materials relative to the thickness of the layer of the fluid spread between the superposed sheet materials by said fluid spreading means adjacent their longitudinal center portions, said fluid thickness reducing means being positioned to engage the leading transverse edges of the superposed sheet materials as they emerge from between said pressure-applying



members while a major portion of the sheet materials still remain on the opposite side of said pressure-applying members from said fluid thickness reducing means.

4,016,579

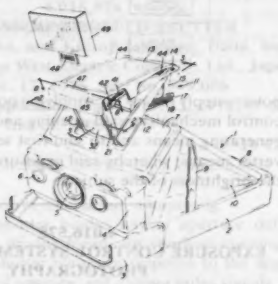
FLASH MOUNTING MEANS FOR CAMERA WITH FOLDING VIEWFINDER

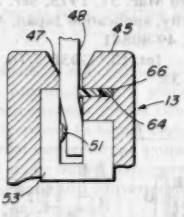
John A. Lewis, Jr., Stoneham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 21, 1975, Ser. No. 569,749

Int. Cl.² G03B *15/03, 13/02*

U.S. Cl. 354—126 **4 Claims**





4. A camera for use with a flash array of the type including a connection blade having terminals on at least one side thereof, said camera comprising:

a camera housing;

a viewfinder mounted on said camera housing for movement between collapsed and erected positions and including a viewfinder cap pivotally mounted near one end thereof for pivotal movement between collapsed and erected positions and a spring for urging the viewfinder

into its erected position, said viewfinder cap including a socket within said viewfinder cap near an end thereof opposite said one end, and means for defining a slot in said viewfinder cap communicating with said socket and through which the blade of such a flash array is adapted to be inserted into said socket;

a plug of insulating material having a set of contacts thereon adapted to engage the terminals on one side of the blade of such a flash array, said plug being configured to be located within said socket with said set of contacts thereon positioned near one side of said socket to engage such terminals;

a plug retaining clip for retaining said plug in its position within said socket, said plug retaining clip being bent over at its ends to form securing ears;

a pair of posts within said viewfinder cap to which said securing ears are attached for securing said retaining clip to said viewfinder cap, said viewfinder cap and said posts being formed as an integrally molded structure; and

a resilient friction tab mounted in said viewfinder cap and extending into said socket from a side thereof opposite said one side for engaging the opposite side of the blade to urge said blade towards said contacts thereby increasing the gripping force on the blade to prevent its ejection from the socket when said viewfinder cap is urged into its erected position under the influence of said spring.

4,016,580

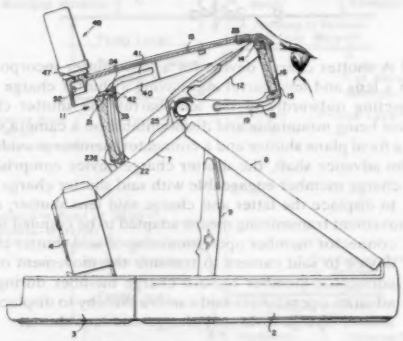
FOLDING VIEWFINDING AND FLASH MOUNTING ASSEMBLY

Patrick L. Finelli, Sudbury, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 21, 1975, Ser. No. 569,750

Int. Cl.² G03B *15/03, 13/06*

U.S. Cl. 354—126 **7 Claims**



1. A viewfinder and flash mounting assembly capable of being readily mounted on a camera during the construction thereof and comprising, in combination, a base member adapted to form a portion of the housing of the camera, a pair of spaced parallel arms formed integrally with and extending from said base member, a viewfinder cap, an eye lens assembly, means pivotally mounting ends of said cap and said eye lens assembly to ends of said arms for rotation about a common first axis, means guidingly coupling said eye lens assembly to an intermediate portion of said arms for movement between erect and collapsed positions, spring means acting between said cap and said base member for urging said cap toward an erect position, means forming a flash receptacle in said cap at an end remote from said first axis, a flexible connector cable joined to said receptacle and adapted to be connected to a corresponding cable in the camera, an objective lens assembly, means mounting said objective lens assembly on said cap at an end thereof adjacent said receptacle for guided movement between an erect and a collapsed position, and means for pivotally mounting said objective lens assembly on said base member comprising a pair of pivot pins formed integral with said objective lens assembly, a pair of posts formed integral with said base member, and a coupling clip, one of said posts being formed with a recess adapted to receive and constrain one of said pins for rotation about a second axis, the other of said pins being formed with an open slot adapted to receive the other of said pins, and said coupling clip comprising means adapted to be fastened over said post and cover said slot after said pin is in place to constrain said pin for rotation about said second axis.

4,016,581

SHUTTER DRIVE SYNCHRONOUSLY SET WITH FILM FRAME AND FLASH CUBE SET

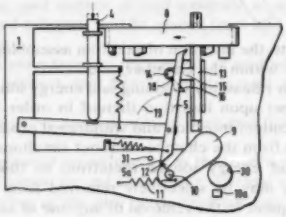
Karl Heinz Lange, Bunde, Germany, assignor to Balda-Werke, Germany

Filed Sept. 12, 1975, Ser. No. 612,998

Claims priority, application Germany, Sept. 26, 1974, 2446084

Int. Cl.² G03B *15/03*

U.S. Cl. 354—144 **14 Claims**



10. In a camera of the type including a housing and a shuttered objective, flash cube assembly, and film transport assembly mounted in the housing, the improvement comprising a shutter release assembly mounted in the camera housing, and means mounted in said camera housing for synchronously resetting the shutter release assembly and for rotating the flash cube assembly as film is transported by the film transport assembly to show a next unexposed frame of film, said means including an intermediate wheel rotatably mounted to said housing adapted for operative coupling with and rotative driving by said film transport assembly, means for rotating said flash cube assembly, said flash cube assembly rotating means mounted within said intermediate wheel for cooperative interengagement with said intermediate wheel, the axes of rotation of said intermediate wheel and said flash cube assembly being non-concentric.

4,016,582

PHOTOGRAPHIC SYSTEM ACCOMMODATING INDEPENDENT INSERTION AND REMOVAL OF BATTERY AND FILM ASSEMBLAGES

Richard R. Wareham, Marblehead, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed June 9, 1975, Ser. No. 584,989

Int. Cl.² G03B *17/26;* **H01M** *2/02*

U.S. Cl. 354—275 **17 Claims**

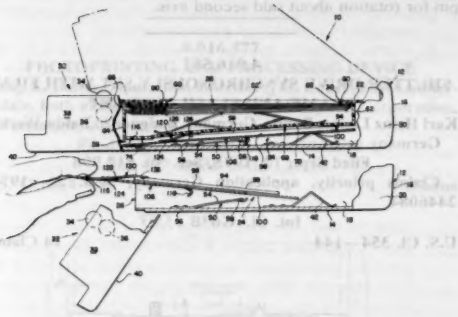
1. A photographic system comprising:

means for effecting a photographic exposure, said means requiring a source of electrical energy for operation thereof and having a chamber therein defining an exposure plane and adapted for receipt of a film assemblage, the chamber additionally including electrical contacts for connecting to the source of electrical energy;

a film assemblage having opposed outside major surfaces adapted for receipt within the chamber with at least one outside major surface thereof in substantial coincidence

with respect to said exposure plane, said film assemblage being readily insertable and withdrawable from said chamber;

a source of electrical energy having opposed outside major surfaces for stationing within the chamber in electrically conductive relation with respect to the electrical contacts therein wherein one outside major surface of said energy source nests in substantial juxtaposition with respect to the other major surface of said film assemblage subse-



quent to the insertion of said film assemblage and energy source within the chamber; and

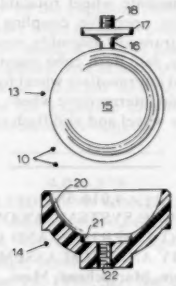
means for releasably retaining said energy source within the chamber upon insertion thereof in order to permit the independent insertion and withdrawal of said film assemblages from the chamber without simultaneously removing said energy source therefrom so that said energy source may be selectively removed from the chamber subsequent to the removal of any one of said film assemblages.

4,016,583

CAMERA STEADYING DEVICE

Calvin B. Yeates, 21158 Bank Mill Road, Saratoga, Calif. 95070

Filed June 24, 1975, Ser. No. 589,662
Int. Cl. G03b *17/56*
U.S. Cl. 354—293 **6 Claims**



1. A camera steadying device for use with a tripod or tripod head having a projecting threaded stud and a camera with an interiorly-threaded receptacle for said stud, including in combination:

a first member for ready and easy attachment to and detachment from a said tripod providing a cup with a stud-receiving interiorly threaded receptacle extending through a bottom portion thereof,

a second member for ready and easy attachment to and detachment from a said camera having a camera-attachment threaded projection for fitting in the camera's said interiorly-threaded receptacle and a ball portion depending from said projection for fitting rotatably in said cup for support thereby without attachment thereto, said ball portion being accessible to the hands of the user after being fitted in said cup with the camera on it, said second member being freely rotatable in said first member and instantly removable therefrom and being held in place during use by one hand of the user at any desired position, with some portion of the hand engaging said first member and other portions engaging said second member,

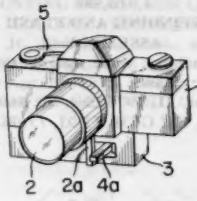
whereby the camera can be supported by the tripod without attachment thereto and hence can instantly be separated therefrom.

4,016,584

SHUTTER CHARGE DEVICE FOR LENS SHUTTER IN A CAMERA HAVING A FOCAL PLANE SHUTTER AND PERMITTING LENS INTERCHANGE

Akihiko Sato, and Yoshiyuki Nakano, both of Tokyo, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Nov. 12, 1975, Ser. No. 631,306
Claims priority, application Japan, Nov. 28, 1974, 49-135917[U]
Int. Cl.³ G03B *11/00*
U.S. Cl. 354—295 **6 Claims**



1. A shutter charge device for a lens shutter incorporated with a lens and lens barrel and having a shutter charge lever projecting outwardly of the lens barrel, the shutter charge device being mountable and dismountable on a camera which has a focal plane shutter and a connector member provided on a film advance shaft, the shutter charge device comprising:

a charge member engageable with said shutter charge lever to displace the latter and charge said lens shutter; and

movement transmitting means adapted to be coupled to said connector member upon mounting of said shutter charge device to said camera to transmit the movement of said connector member to said charge member during film advance operation in said camera thereby to displace said shutter charge lever and charge said lens shutter.

4,016,585

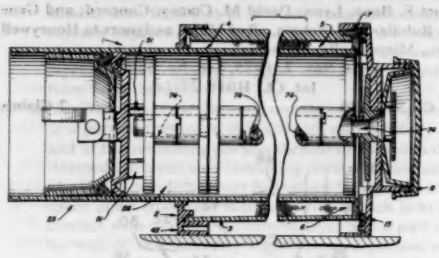
CENTER FILLING VARIABLE VOLUME FILM DRUM

Robert E. Chapman, Ann Arbor, Mich., assignor to Photo Systems, Inc., Dexter, Mich.

Filed Aug. 14, 1975, Ser. No. 604,690
Int. Cl.² G03D *13/02*
U.S. Cl. 354—331 **9 Claims**

1. A variable volume film drum for processing photographic material including a container having two open ends for holding said material, a lockable piston adapted to be inserted in one end of said container and movable therein to any location and a fluid control assembly adapted to cover the remaining open end of said container for introducing fluids, the improvement comprising:

conduit means extending down the longitudinal axis of said



container for providing an enclosed path for fluids to enter said container.

4,016,586

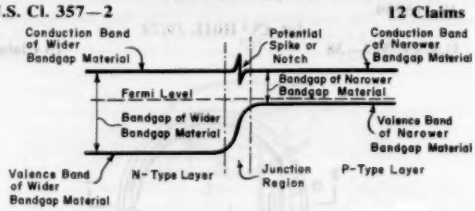
PHOTOVOLTAIC HETEROJUNCTION DEVICE EMPLOYING A WIDE BANDGAP MATERIAL AS AN ACTIVE LAYER

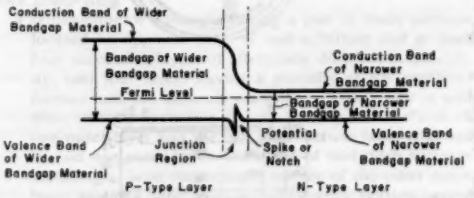
Richard L. Anderson, Syracuse; Jack K. Clifton, New City, both of N.Y.; James V. Masi, Huntington, and Seymour Merrin, Fairfield, both of Conn., assignors to Innotech Corporation, Norwalk, Conn.

Continuation of Ser. No. 455,309, March 27, 1974. This application Jan. 6, 1976, Ser. No. 646,935

Int. Cl.² H01L *45/100*

U.S. Cl. 357—2 **12 Claims**


Conduction Band of Wider Bandgap Material
Potential Spike or Notch
Conduction Band of Narower Bandgap Material
Bandgap of Narower Bandgap Material
Fermi Level
Bandgap of Wider Bandgap Material
Valence Band of Narower Bandgap Material
Valence Band of Wider Bandgap Material
N-Type Layer
Junction Region
P-Type Layer


Conduction Band of Wider Bandgap Material
Bandgap of Wider Bandgap Material
Fermi Level
Conduction Band of Narower Bandgap Material
Bandgap of Narower Bandgap Material
Valence Band of Wider Bandgap Material
Junction Region
Potential Spike or Notch
Valence Band of Narower Bandgap Material
P-Type Layer
N-Type Layer

1. A semiconductive heterojunction photovoltaic device of the type comprising a pair of layers of semiconductor materials disposed in contact with one another and forming a junction therebetween, one of said layers exhibiting N-type conductivity and the other exhibiting P-type conductivity, and the material of each of said layers characterized by a bandgap separating a conduction energy level band from a valence energy level band and by an electron affinity; and means for electrically contacting each of said layers; said device characterized in that:

the bandgap of the material of one of said semiconductor layers is more than about twice the bandgap of the material of the other of said semiconductor layers; and

the electron affinity of the material having the larger bandgap is substantially equal to or less than the electron affinity of the layer having the smaller bandgap material for providing reduced junction impedance to carrier flow.

4,016,587

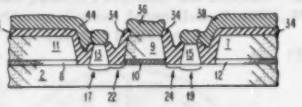
RAISED SOURCE AND DRAIN IGFET DEVICE AND METHOD

Francisco H. De La Moneda, Reston, Va., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 3, 1974, Ser. No. 529,193

Int. Cl.² H01L *29/78, 29/06, 29/04*

U.S. Cl. 357—23 **12 Claims**



1. An insulated gate field effect transistor comprising:

a silicon substrate of a first conductivity type having a surface;

a first epitaxial region of a second conductivity type, grown on said surface of said substrate so as to project above said surface;

a second epitaxial region of said second conductivity type, grown on said surface of said substrate so as to project above said substrate and be spaced from said first epitaxial region;

a first insulating layer on the surface of said substrate and located between said first and said second epitaxial regions;

a first conductive layer deposited over said first insulating layer;

said first epitaxial region serving as the source, said second epitaxial region serving as the drain, and said conductivity layer serving as the gate of an insulated gate field effect transistor;

a second insulating layer substantially thicker than said first insulating layer, separating said first conductive layer from said first and second epitaxial regions, for reducing the source-to-gate and drain-to-gate capacitance;

said first and second epitaxial regions forming shallow P-N junctions with said substrate whereby the resulting IGFET device has a low junction capacitance and the source and drain regions have a low sheet resistivity.

4,016,588

NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE

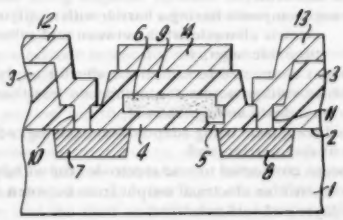
Shuichi Ohya, and Masanori Kikuchi, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Dec. 24, 1975, Ser. No. 644,056

Claims priority, application Japan, Dec. 27, 1974, 50-1867; Dec. 27, 1974, 50-1869; Dec. 27, 1974, 50-1871; Dec. 27, 1974, 50-1872; Dec. 27, 1974, 50-1873; Dec. 27, 1974, 50-1876

Int. Cl.² H01L *29/78*

U.S. Cl. 357—23 **6 Claims**



1. In an avalanche injection type semiconductor memory device comprising a semiconductor substrate of one conductivity type, source and drain regions of the opposite conductivity type formed on the surface of said semiconductor sub-

strate, a first insulating film formed over the channel area of said semiconductor substrate between said source and drain regions, a floating gate formed on said first insulating film, a second insulating film covering said floating gate, and a control gate formed on said second insulating film, the improvement which comprises: said first insulating film having a thin portion having a lesser thickness than the remaining portion thereof, said thin portion of said first insulating film being provided in the vicinity of at least one of said source and drain regions.

4,016,589

SEMICONDUCTOR DEVICE

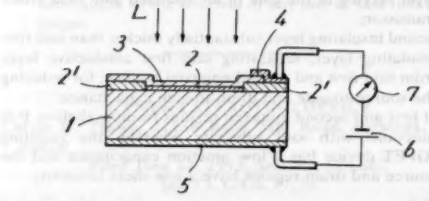
Shigeru Tanimura; Nobuaki Miura, and Osamu Asano, all of Kyoto, Japan, assignors to Omron Tateisi Electronics Co., Ltd., Kyoto, Japan

Continuation-in-part of Ser. No. 304,809, Nov. 8, 1972, abandoned. This application Mar. 26, 1974, Ser. No. 455,008

Claims priority, application Japan, Nov. 10, 1971, 46-90139; Mar. 10, 1972, 47-25021

Int. Cl.² H01L *27/14, 31/00, 29/48, 29/56*

U.S. Cl. 357—30 **29 Claims**



1. A photosensitive semiconductor device comprising:

a composite including:

a substrate of a semiconductor selected from the group consisting of Si, Ge and GaAs,

an insulating layer deposited in substantially uniform thickness on said semiconductor substrate, the material layer being selected from the group consisting of SiO_2, Si_3N_4 and GeO_2, and said insulating layer being in the range of from 27A to 500A in thickness,

a tin oxide layer deposited on said insulating layer,

metal electrodes deposited on said tin oxide layer and the substrate,

said composite having a barrier with rectifying and photoelectric characteristics between said substrate and said tin oxide layer,

means connected to said electrodes for applying a reverse bias voltage across the composite less than the reverse breakdown voltage thereof,

said composite being adapted for receiving radiation energy at said barrier, and

means connected to said electrodes for withdrawing a photosensitive electrical output from between said tin oxide layer and said substrate,

whereby said device exhibits a radiation energy response characteristic which is a function of the level of said applied reverse bias voltage and is substantially increased for a thickness of said insulating layer within said range relatively to a thickness outside of said range.

4,016,590

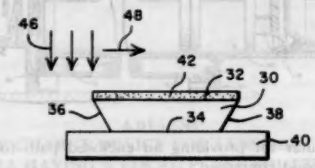
ELECTROMAGNETIC RADIATION DETECTOR

Robert F. Baur, Lynn; David M. Comey, Concord, and Gene A. Robillard, Stoneham, all of Mass., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 7, 1975, Ser. No. 629,836

Int. Cl.² H01L *27/14*

U.S. Cl. 357—30 **7 Claims**



1. An electromagnetic radiation detector comprising:

a body of detector material;

first and second opposing surfaces of the body, the first surface being adapted to receive eletromagnetic radiation; and

a first side sloping generally inwardly from the first surface to the second surface.

4,016,591

SEMICONDUCTOR CONTROLLED RECTIFIER

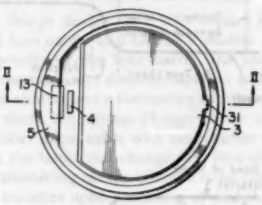
Yoshio Terasawa, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

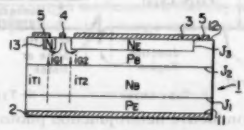
Filed Oct. 15, 1974, Ser. No. 515,029

Claims priority, application Japan, Oct. 17, 1973, 48-115909

Int. Cl.² H01L *29/74*

U.S. Cl. 357—38 **13 Claims**





1. A semiconductor controlled rectifier comprising:

a semiconductor substrate having a pair of opposite principal surfaces and four contiguous layers between said principal surfaces having alternatively different conduction types, PN junctions being formed between the adjacent ones of said four layers, at least one of said principal surfaces being formed by exposed surfaces of one of the outermost layers of said four layers and the intermediate layer adjacent thereto;

a pair of main electrodes disposed on said principal surfaces in ohmic contact with said outermost layers respectively;

a gate electrode disposed on said one principal surface in contact with said intermediate layer;

an auxiliary region in said intermediate layer having a conduction type reverse to that of said intermediate layer, a smaller area than that of said one outermost layer and a surface exposed in said one principal surface, said gate electrode being positioned between said one outermost layer and said auxiliary region and being spaced apart from both thereof;

an auxiliary electrode disposed on said one principal surface at a portion thereof in contact with said auxiliary region and at the remaining portion thereof in contact with said intemediate layer, said remaining portion of said auxiliary electrode including a part positioned by a predetermined space apart from said main electrode which is in ohmic contact with said one outermost layer and a part spaced by way of said auxiliary region from a portion of said intermediate layer in contact with said gate electrode; and

means for short-circuiting the exposed portion of the PN junction formed between said one outermost layer and said intermediate layer at a location remote from said gate electrode.

4,016,592

LIGHT-ACTIVATED SEMICONDUCTOR-CONTROLLED RECTIFIER

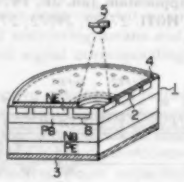
Tsutomu Yatsuo, and Nobutake Konishi, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 4, 1975, Ser. No. 555,279

Claims priority, application Japan, Mar. 15, 1974, 49-29135

Int. Cl.² H01L 29/74

U.S. Cl. 357—38 **13 Claims**



1. A light-activated semiconductor-controlled rectifier device comprising:

a semiconductor substrate having a pair of main surfaces located on opposite sides of said substrate and at least four successive layers of alternately different conductivity, said four layers having a plurality of PN junctions formed between adjacent ones of said layers, one of said main surfaces including at least the exposed surfaces of one outer layer and the one intermediate layer adjacent to said one outer layer, the other of said main surfaces including at least the exposed surface of the other outer layer; said one outer layer including a first portion having a plurality of through apertures substantially uniformly distributed over said first portion, said one intermediate layer being exposed to said one main surface through said apertures of said one outer layer, and a second portion completely separated from said first portion by said one intermediate layer therebetween;

a first continuous, single-piece main electrode provided on said one main surface and in ohmic contact with at least the surface of said first portion, with that part of the surface of said one intermediate layer which is exposed through said through apertures, with the surface of said second portion at its periphery and with that part of the surface of said exposed portion of said one intermediate layer which is adjacent to said second portion;

a second main electrode provided on said other main surface and in ohmic contact with at least the surface of said other outer layer; and

a photo signal radiating means provided in the vicinity of the surface of said second portion of said one main surface for turning on said device.

4,016,593

BIDIRECTIONAL PHOTOTHYRISTOR DEVICE

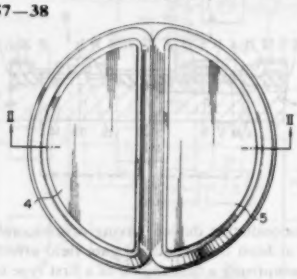
Nobutake Konishi; Tsutomu Yatsuo; Tatsuya Kamei; Masahiro Okamura, and Takuzo Ogawa, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed June 3, 1975, Ser. No. 583,406

Claims priority, application Japan, June 7, 1974, 49-64084

Int. Cl.² H01L 29/74

U.S. Cl. 357—38 **15 Claims**



1. A bidirectional photo thyristor device comprising:

a semiconductor substrate having first and second principal surfaces opposite to one another and a side surface extending from said first principal surface to said second principal surface, said substrate including first and second substrate portions, each of which includes

a first semiconductor layer of a first conductivity type one surface of which extends to said first principal surface,

a second semiconductor layer of a second conductivity type, opposite said first conductivity type, disposed in contact with and defining a first PN junction with said first semiconductor layer, and

a third semiconductor layer of said first conductivity type, disposed in contact with and defining a second PN junction with said second semiconductor layer, one surface of said third semiconductor layer extending to the second principal surface of said substrate;

said first substrate portion further including a fourth semiconductor layer of said second conductivity type formed in a first surface portion of said one surface of said first semiconductor layer and defining therewith a fourth PN junction which extends to said first principal surface of said substrate;

said second substrate portion further including a fifth semiconductor layer of said second conductivity type formed in a first surface portion of said one surface of said third semiconductor layer and defining therewith a fifth PN junction which extends to said second principal surface of said substrate;

said substrate further including a recess extending from said first principal surface toward said second principal surface and being disposed between the first and second substrate portions of said substrate so as to expose said first and second semiconductor layers;

first main electrode means disposed upon the first principal surface of said substrate so as to be in contact with said first and fourth semiconductor layers of said first substrate portion and the first semiconductor layer of said second substrate portion;

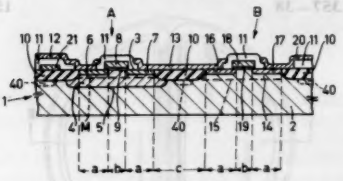
second main electrode means, disposed upon the second principal surface of said substrate so as to be in contact with the third semiconductor layer of said first substrate portion and the third and fifth semiconductor layers of said second substrate portion; and

means for illuminating the surfaces of said first and second substrate portions which are exposed by said recess with a light trigger signal for controlling switching operations of said first and second substrate portions.

4,016,594
SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING THE DEVICE

Joseph Shappir, Technion City, Ill., assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 245,243, April 18, 1972, abandoned. This application Apr. 8, 1974, Ser. No. 458,527
Claims priority, application Netherlands, June 8, 1971, 7107805
Int. Cl.² H01L *27/02, 27/12*
U.S. Cl. 357—41 **9 Claims**

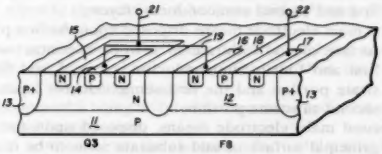


1. A semiconductor device having a semiconductor body comprising at least one insulated gate field effect transistor, said body comprising a first region of a first type conductivity and a second region of a second type conductivity adjoining the surface and forming a p-n junction with the first region, said insulated gate field effect transistor having spaced source and drain zones of the first type conductivity in the second region and adjoining the surface, at least one gate electrode layer extending over the space between the source and drain zones and being separated from the semiconductor body by an insulating layer, a pattern of electrically insulating material at least partly inset in the semiconductor body and comprising a portion entirely surrounding the second region at the surface, the outer dimensions of said second region being defined solely by said inset pattern portion and by the p-n junction between the first and the second regions which adjoins said portion of the inset pattern, the source and drain zones also adjoining the inset pattern, said first region having a further part adjoining the surface outside said inset pattern portion, and a second circuit element comprising at least one surface zone of the second conductivity type in said further part of the first region and adjoining said inset pattern, said second region of the second type conductivity having a doping profile such that in a zone adjoining the surface the doping concentration increases to a maximum value from the surface to the interior.

4,016,595
FIELD EFFECT TRANSISTOR SWITCHING CIRCUIT

James B. Compton, Cupertino, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Division of Ser. No. 474,004, May 28, 1974, Pat. No. 3,916,222. This application Sept. 2, 1975, Ser. No. 609,443
Int. Cl.² H01L *27/02*
U.S. Cl. 357—43 **1 Claim**

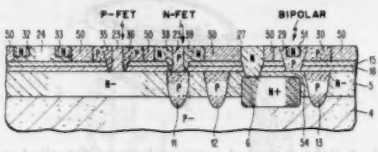


1. A combination transistor structure and FET structure on the same substrate comprising:
a substrate of a first conductivity type material,
an epitaxial layer of a second conductivity type material grown on said substrate,
isolation regions of said first conductivity type dividing the structure into isolated areas and extending into said substrate,
a transistor formed in a first area wherein said substrate serves as the collector comprising,
an emitter of said first conductivity type diffused into said epitaxial layer, and
a base region of said second conductivity type diffused into said epitaxial layer separated from said emitter, said base being diffused at a higher concentration than said epitaxial layer,
a field effect transistor formed in a second area comprising,
a gate region of said first conductivity type diffused into said epitaxial layer and extending to said isolation region, and
a source and a drain region of said second conductivity type diffused into said epitaxial layer on either side of said region, said source and drain regions being diffused at a higher concentration than said epitaxial layer,
electrical conductor means interconnecting said emitter region and said source region, the collector of said transistor connected to the channel region under said gate by means of said substrate, and
external contacts for said transistor base region and for said FET drain region.

4,016,596
HIGH PERFORMANCE INTEGRATED BIPOLAR AND COMPLEMENTARY FIELD EFFECT TRANSISTORS

Ingrid Emese Magdo, and Steven Magdo, both of Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 588,524, June 19, 1975, Pat. No. 3,955,269. This application Jan. 26, 1976, Ser. No. 652,268
Int. Cl.² H01L *27/02, 29/72, 27/04, 27/12*
U.S. Cl. 357—43 **7 Claims**



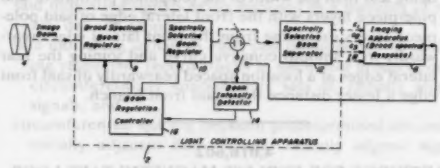
1. A semiconductor integrated circuit comprising:
a monocrystalline semiconductor substrate of a first conductivity type;
a first monocrystalline layer of a second conductivity type disposed over said substrate;
a subcollector region of said second conductivity type extending from said substrate into said first layer and below the upper surface thereof;
second and third regions of said first conductivity type extending from said substrate to the upper surface of said first layer, said second region surrounding said subcollector region, the conductivity level of said second region being greater than that of said third region;
a dielectric layer disposed over said first monocrystalline layer having openings therein over said subcollector region, said third region and at another location over said first monocrystalline layer;
a second layer disposed over said dielectric layer and in said openings;
said second layer including monocrystalline regions over the portions of said first monocrystalline layer exposed by said openings, polycrystalline regions over said dielectric layer in areas contiguous to each said monocrystalline region, and dielectric isolation regions separating each said contiguous polycrystalline/monocrystalline regions from every other contiguous polycrystalline/monocrystalline region;

a bipolar transistor of said second conductivity type formed in said monocrystalline region over said subcollector;
field effect transistors of second and first channel types formed in said monocrystalline regions over said third region and said another location, respectively; and
a polycrystalline silicon resistor formed in a polycrystalline region disposed over said dielectric layer.

4,016,597
COLOR VIDEO CAMERA WITH SELECTIVELY EXPANDED SENSITIVITY

Peter L. P. Dillon, and James J. DePalma, both of Pittsford, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 11, 1975, Ser. No. 612,512
Int. Cl.² H04N *9/04, 5/30*
U.S. Cl. 358—41 **9 Claims**



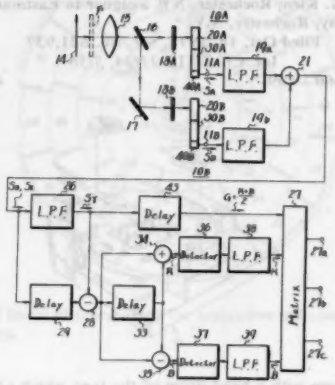
1. In a color video camera having means for defining an image beam of light reflected from a scene, apparatus comprising:
a. at least one broad spectral response imaging device arranged in the path of the image beam;
b. intensity measuring means for producing a signal relating to image beam intensity;
c. a beam regulation controller for receiving the intensity signal from said measuring means and for producing at least one control signal corresponding to said intensity signal;
d. a spectrally selective image beam regulator having means for selectively blocking portions of the image beam which are outside the visible spectrum in response to a control signal from said beam regulation controller; and
e. a spectrally selective beam separator including filter means for separating the image beam, prior to arrival at said imaging device, according to three primary wavelength ranges which are a preselected basis for defining visible-light color images, said filter means permitting infrared light to pass with light of at least one said primary wavelength ranges whereby transmission of an infrared component of the image beam to influence said imaging device(s) is regulated by said image beam regulator and such regulation is related to image intensity by the control action of said beam regulation controller.

4,016,598
SOLID STATE CAMERA HAVING PLURAL IMAGE SENSORS

Seisuke Yamanaka, Mitaka, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Mar. 26, 1975, Ser. No. 562,347
Claims priority, application Japan, Mar. 29, 1974, 49-35276; Apr. 25, 1974, 49-46941
Int. Cl.² H04N *9/04*
U.S. Cl. 358—41 **6 Claims**

1. A solid state color camera comprising:
a plurality of image sensors, each having a plurality of picture-sensing units spaced apart by an alignment pitch of τ_H,
a number of color filters, each having color stripe elements extending in a horizontal direction and being aligned vertically to correspond to respective horizontal rows of said image sensors,
means for displaying an image simultaneously on each of said image sensors through respective ones of said color filters,
means for positions the image on each sensor with a displacement of $\tau_{H/N}$ in a given direction with respect to at least one other of said sensors where N equals the number of image sensors in said camera,
means coupled to said picture sensing units for sequentially

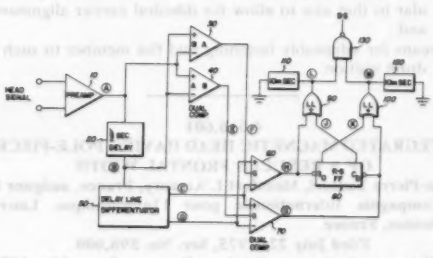


reading said image being displayed on said sensors in said given direction at a given read-out frequency and said reading means producing respective output signals,
means associated with said reading means for shifting the read-out phases thereof by 2 $\pi_{/N}$,
means coupled to said reading means for mixing their respective output signals therefrom, and
means for deriving luminance and chrominance signals from said mixing means.

4,016,599
ANTI-SHOULDERING READ CIRCUIT FOR MAGNETIC DISK MEMORY

Paul Sherer, Costa Mesa, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 19, 1976, Ser. No. 668,367
Int. Cl.² G11B *5/09*
U.S. Cl. 360—53 **10 Claims**



1. A circuit for detecting valid peaks of an input signal comprising:
means for delaying said input signal to produce a delayed signal,
means responsive to said input signal and said delayed signal for generating a gating signal,
means coupled to said delaying means and responsive to said delayed signal for producing a derivative signal,
means coupled to said means for producing said derivative signal and said means for generating a gating signal and to gate said derivative signal, and

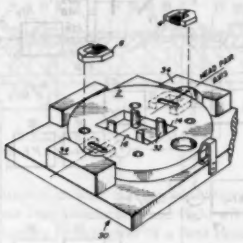
flip-flop circuit means coupled to said gate means and responsive thereto to generate output signals indicative of the presence of positive and negative peaks in said input signals.

4,016,600

CARRIER FOR MOUNTING PAIRS OF MAGNETIC HEADS TO A DRUM-TYPE TAPE SCANNING UNIT

Thomas G. Kirn, Rochester, NY, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 14, 1975, Ser. No. 621,937
Int. Cl.² G11B *21/24, 5/56*
U.S. Cl. 360—109 **4 Claims**



1. For use with a head drum of the type which (1) is employed in units for scanning magnetic tape with a cooperating pair of magnetic heads, and (2) has a drum section which is rotatable about an axis and is provided with an associated axis indicating means at a face thereof for defining two parallel reference lines at preselected fixed distances from said axis, a carrier for mounting such a pair of heads to such face of the drum section, comprising:

a flat member having defined at opposite sides thereof a pair of respective head sites which establish a head pair axis extending therebetween, said member having formed therein a slot characterized by two guide edges which, at least over operative parts thereof, are substantially straight and are substantially perpendicular to said head pair axis, said edges being arranged at respective distances from the midpoint between said head sites corresponding to such preselected distances to closely engage in a sliding relationship such axis indicating means, thereby blocking relative translational motion of said member over said drum section along the head pair axis while permitting relative translational motion perpendicular to that axis to allow for dihedral carrier alignment; and

means for adjustably fastening said flat member to such a drum section.

4,016,601

INTEGRATED MAGNETIC HEAD HAVING POLE-PIECES OF A REDUCED FRONTAL WIDTH

Jean-Pierre Lazzari, Montfort L'Amaury, France, assignor to Compagnie Internationale pour l'Informatique, Louveciennes, France

Filed July 22, 1975, Ser. No. 598,000
Claims priority, application France, Jan. 10, 1975, 75.00652
Int. Cl.² G11B *5/22, 5/25, 5/20, 5/12*
U.S. Cl. 360—122 **5 Claims**

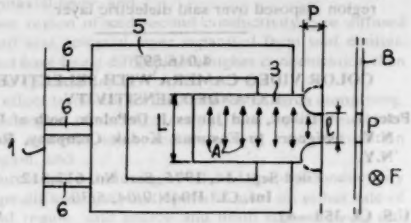
1. An integrated magnetic head structure comprising in combination:

a substrate having a front edge;

a pair of overlying pole-piece magnetic layers, each having an easy axis of anisotropy in a direction parallel to said front edge, supported on said substrate;

a dielectric non-magnetic layer positioned between said magnetic layers and thus defining a magnetic gap;

a flat conductor winding coil, also supported on said substrate and having a front branch inserted between said pole-piece layers at a distance spaced rearwardly from said front edge and said dielectric non-magnetic layer, the lateral width of said pole-piece layers at said front edge



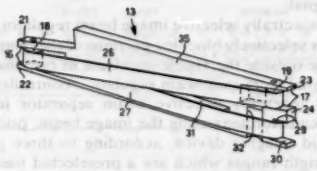
being less than the width of the remaining portions of said pole-piece layers with the front lateral edge of said pole-piece layers extending from the front lateral edges rearwardly in a smooth concave curve and joining the rear lateral edges at a location spaced rearwardly of said front edge a lesser distance than said front branch.

4,016,602

CARTRIDGE FOR ENDLESS MAGNETIC-TAPE LOOP AND DEVICE FOR RECORDING AND/OR READING THEREOF

Nicolo Giolitti, Ivrea (Turin), and Michele Bovio, Banchette (Turin), both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed July 8, 1975, Ser. No. 594,156
Claims priority, application Italy, July 15, 1974, 69243/74
Int. Cl.² G11B *23/06;* **B65H** *17/48*
U.S. Cl. 360—132 **2 Claims**



1. A small dimension cartridge for an endless tape loop for use in a small calculating or accounting unit or the like, comprising:

a. a container;

b. a substantially parallelepiped plate mounted inside said container and including first and a second short sides and first and a second long sides longer than said short sides;

c. first and second guide means mounted on said plate at said first short side and having the longitudinal axes thereof lying in a plane substantially parallel to said short sides;

d. third guide means mounted on said plate at said second short side and having the longitudinal axis thereof lying in a plane substantially parallel to said short sides, wherein said first and third guide means define therebetween a first tape path disposed substantially diagonally with respect to said plate around which a plurality of lengthening tape coils are wound and wherein said second and said third guide means define therebetween a second tape path substantially parallel to said long sides and around which a connecting coil of said tape is wound connecting the innermost coil with the outermost coil of said first tape path; and

e. at least one access aperture in said container in correspondence with said second tape path and across which

the tape is accessible to effect the driving, recording and/or reading thereof.

4,016,603

DISK STORAGE APPARATUS HAVING SIGNALS RECORDED IN A SPECIFIC FORMAT

Hjalmar Holmboe Ottesen, Oslo, Norway, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 30, 1975, Ser. No. 582,515

Int. Cl.[2] G11B *5/82, 17/22*

U.S. Cl. 360—135 **34 Claims**

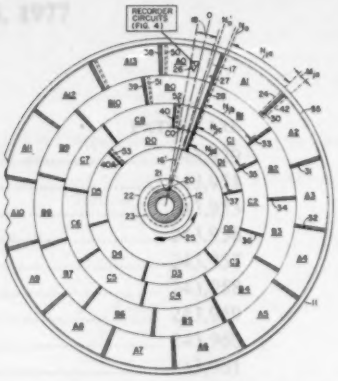
1. A circular planar magnetic storage disk having a plurality of substantially concentric record track location indicating signals,

the improvement including in combination:

said indicating signals being disposed in a plurality of radially defined groups;

said indicating signals in each said radial group for indicating respective record tracks in each said group being in circumferentially spaced-apart sets of radially aligned signals; and

circumferential spacing between predetermined circumferentially adjacent ones of said radially aligned signals disposed at a predetermined radial position in each said group being circumferentially spaced a substantially identical lineal distance along the respective indicated record tracks.



DESIGN PATENTS

GRANTED APRIL 5, 1977

ERRATA

For CLASS	See PATENT NO.
008–364	243,929
016–065	243,951
025–064	243,953
014–043	243,956
064–011 B	243,957
064–011 B	243,958
014–046	243,959
015–138	243,960
014–058	243,961
015–131	243,972
024–017	243,973

DESIGN PATENTS

GRANTED APRIL 5, 1977

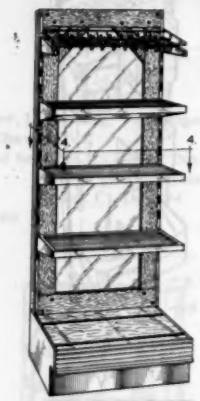
ERRATA

Des CLASS	PATENT NO.
008–304	243,929
010–005	243,951
025–004	243,953
014–043	243,958
064–011 B	243,957
064–011 B	243,958
014–046	243,959
015–138	243,960
014–058	243,961
015–131	243,972
024–017	243,973

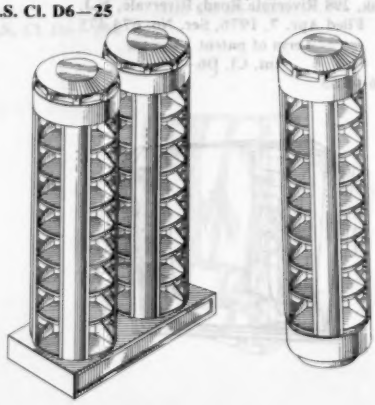
DESIGNS

APRIL 5, 1977

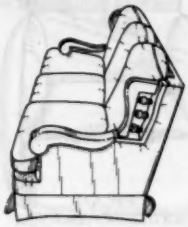
243,891
DISPLAY STAND FOR BAKERY PRODUCTS OR THE LIKE
Alan K. Snyder, River Forest, Ill., assignor to Chicago Display Company
Filed Apr. 7, 1976, Ser. No. 674,394
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—24



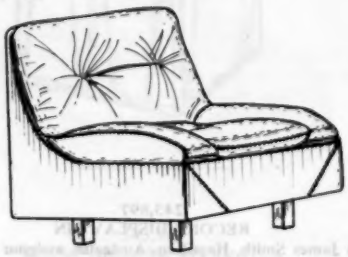
243,892
ARTICLE DISPLAY STAND
Roger G. Ferriter, Yonkers, and Fred Howard, New York, both of N.Y., assignors to Wix Corporation, Gastonia, N.C.
Filed May 6, 1976, Ser. No. 683,847
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—25



243,893
SOFA
Lester Beall, Jr., High Point, N.C., assignor to Treno Line Furniture Corporation, Amsterdam, N.Y.
Filed Sept. 25, 1975, Ser. No. 616,741
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63

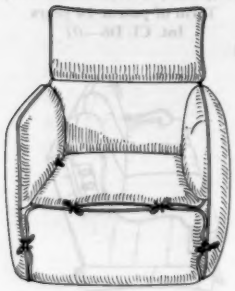


243,894
SEAT
Giovanni Offredi, Milan, Italy, assignor to Fratelli Saporiti, Besnate (Varese), Italy
Filed Mar. 18, 1975, Ser. No. 559,450
Claims priority, application Italy, Sept. 19, 1974, 60913/74; Sept. 19, 1974, 60914/74; Sept. 19, 1974, 60915/74
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—66



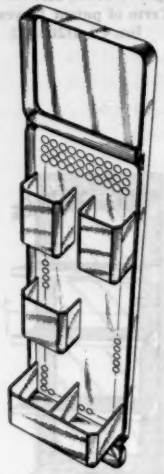
243,895
CUSHIONED SLING CHAIR
Lynn L. Powell, Lincolnton, N.C., assignor to Burris Industries, Incorporated, Lincolnton, N.C.
Filed Nov. 24, 1975, Ser. No. 634,484
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—66

243,896
CHAIRS
Otto Zapf, Eschborn, Germany, assignor to Knoll International, Inc., Greenwich, Conn.
Division of Ser. No. 376,746, July 5, 1973, Pat. No. D240,783.
This application Oct. 24, 1974, Ser. No. 517,632
Claims priority, application Germany, Feb. 28, 1973, 73MR8137; Mar. 3, 1973, 73MR8139
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—71

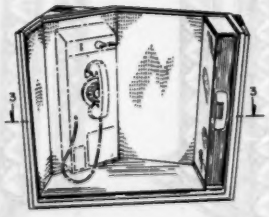


243,897
RECORD DISPLAY BIN
Brian James Smith, Hamilton, Australia, assignor to London Merchandisers Pty. Limited, Hamilton, Australia
Filed May 16, 1975, Ser. No. 578,016
Claims priority, application Australia, Jan. 30, 1975, 66392/75
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—130

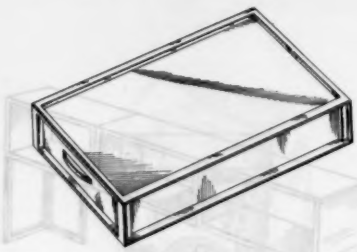
243,898
STORAGE RACK FOR LOCKERS OR THE LIKE
Frank Micciche, Floral Park, N.Y., assignor to Frank Micciche, Floral Park, N.Y.
Filed Dec. 23, 1974, Ser. No. 535,833
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—131



243,899
SHELF FOR COIN OPERATED TELEPHONES
Lajos Novak, 298 Rivervale Road, Rivervale, N.J.
Filed Apr. 7, 1976, Ser. No. 674,475
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—133

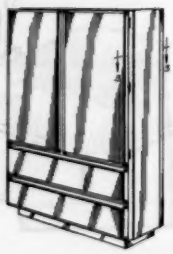


243,900
CABINET FOR PHOTOGRAPHIC SHEET PRODUCTS
William Paul Boyd, Macedon, and Mark John Morse, Ontario, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Nov. 17, 1975, Ser. No. 632,753
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—158

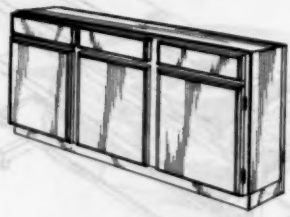


243,901
CHEST
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,962
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—160

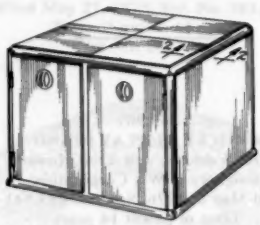
243,902
ARMOIRE
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,963
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—164



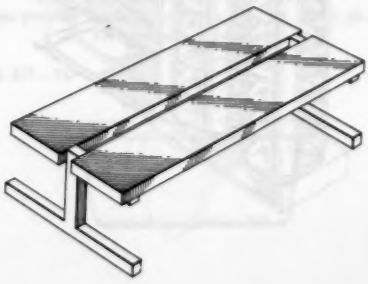
243,903
BUFFET
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,968
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—164



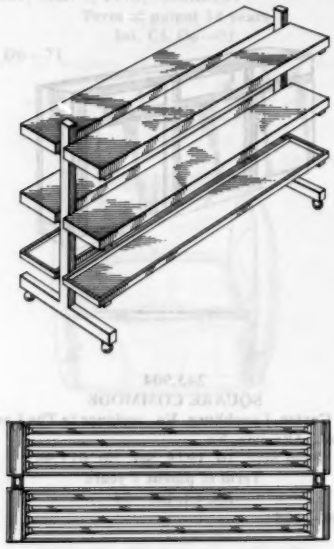
243,904
SQUARE COMMODE
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,967
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—168



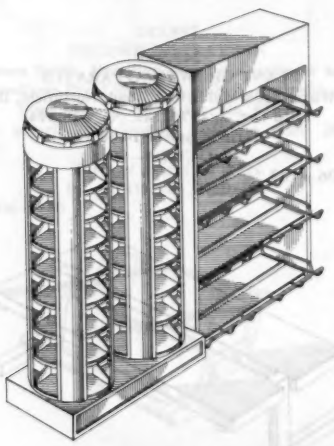
243,905
PLANT GROWTH APPARATUS
R. Louis Ware, 2108 Middlefork Road, Northfield, Ill. 60093
Filed Oct. 2, 1975, Ser. No. 618,894
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—183



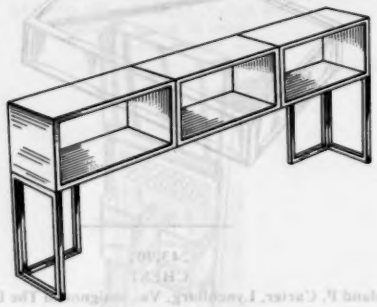
243,906
PLANT GROWTH APPARATUS
R. Louis Ware, 2108 Middlefork Road, Ill. 60093
Filed Oct. 2, 1975, Ser. No. 618,896
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—183



243,907
ARTICLE DISPLAY STAND
Roger G. Ferriter, Yonkers, and Fred Howard, New York, both of N.Y., assignors to Wix Corporation
Filed May 6, 1976, Ser. No. 683,841
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—188



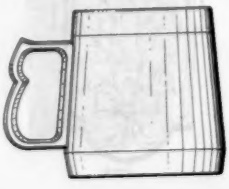
243,908
STORAGE UNIT
Paul J. Neff, Mississauga, Canada, assignor to Neff Kitchen Manufacturers Limited, Brampton, Canada
Filed July 18, 1975, Ser. No. 596,938
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—190



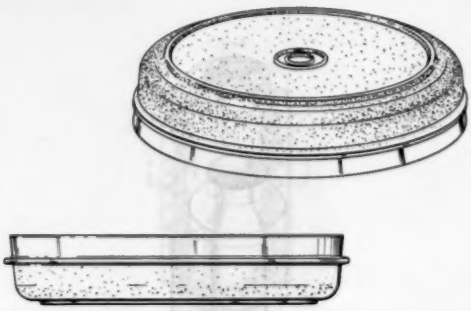
243,909
COMBINED SEAT AND BACKREST
Gregory S. Gabourie, Ajax, Canada, assignor to Global Upholstery Company Limited, Canada
Filed June 2, 1975, Ser. No. 582,874
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—197

243,910
TUMBLER
Kathryn S. Herpel, Pittsburgh, Pa., assignor to Brockway Glass Company, Inc., Brockway, Pa.
Filed Nov. 24, 1975, Ser. No. 634,470
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—6

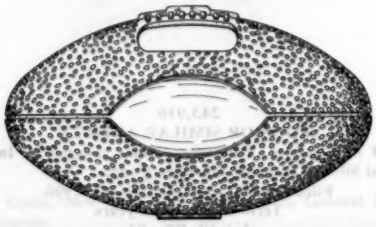
243,911
DRINKING MUG
Stanley R. Thorud, Anoka, Minn., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Aug. 14, 1975, Ser. No. 604,578
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—9



243,912
SERVING PLATE OR THE LIKE
Robert H. C. M. Daenen, Hekelgem, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed July 11, 1975, Ser. No. 595,199
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—23

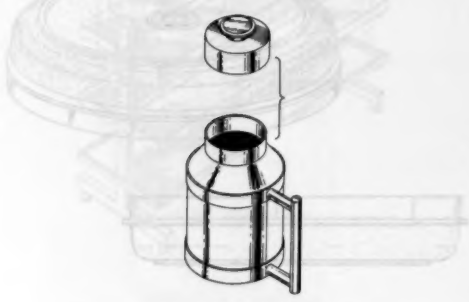


243,913
LUNCHPAIL OR SIMILAR ARTICLE
Robert Charles Miles, 2414 Rochester Road, Royal Oak, Mich. 48073
Filed May 27, 1975, Ser. No. 581,000
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D7—76



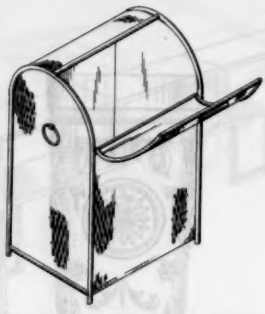
243,914
CONTAINER FOR FOOD OR THE LIKE
Zenichi Marubashi, Isezaki, and Yoshikuni Kinoshita, Tokyo, both of Japan, assignors to Maruka Shokuhin Kabushiki Kaisha, Isezaki and Ryohsei Plastic Industry Co., Ltd., Tokyo, both of, Japan
Filed Oct. 10, 1975, Ser. No. 621,563
Claims priority, application Japan, July 15, 1975, 50-29331
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—76

243,915
BARBECUE COAL SNUFFER
Whitney Wilhelmy, P.O. Box 746, Kings Beach, Calif. 95719
Filed Dec. 8, 1975, Ser. No. 638,527
Term of patent 14 years
Int. Cl. D7—*04;* D23—*03*
U.S. Cl. D7—129



243,916
SPOON OR SIMILAR ARTICLE
Ronald A. Guodace, Yalesville, Conn., assignor to International Silver Company, Meriden, Conn.
Filed June 5, 1975, Ser. No. 583,996
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

243,917
CLOTHES HAMPER
Barbara Adler Katzander, New York, NY, assignor to Joseph A. Kaplan & Sons, Inc., Yonkers, N.Y.
Filed May 8, 1975, Ser. No. 575,816
Term of patent 14 years
Int. Cl. D7—*07;* D9—*04*
U.S. Cl. D7—163

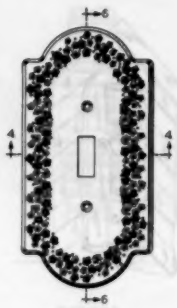


243,918
WALL PLATE
Joan Klatil Creamer, Warwick, R.I., assignor to General Electric Company
Filed Dec. 23, 1974, Ser. No. 536,282
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351

243,919
WALL PLATE
Joan Grieb, Westfield, N.J., assignor to General Electric Company
Filed Oct. 20, 1975, Ser. No. 624,083
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350

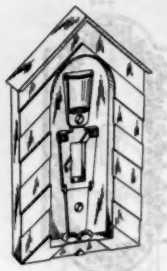
243,920
WALL PLATE
Leonard Fine, Brooklyn, N.Y., assignor to General Electric Company
Filed Oct. 20, 1975, Ser. No. 624,087
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350

243,921
WALL PLATE
Joan K. Creamer, Warwick, R.I., assignor to General Electric Company
Filed Oct. 10, 1975, Ser. No. 621,271
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351



243,922
WALL PLATE
Joan Grieb, New York, N.Y., assignor to General Electric Company
Filed Oct. 20, 1975, Ser. No. 624,036
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351

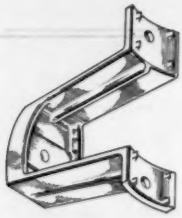
243,923
WALL PLATE
Joan Klatil Creamer, Warwick, R.I., assignor to General Electric Company
Filed Aug. 29, 1974, Ser. No. 501,920
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351



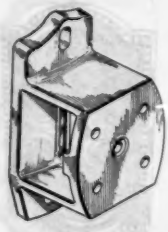
243,924
WALL PLATE
Joan Klatil Creamer, Warwick, R.I., assignor to General Electric Company
Filed Aug. 29, 1974, Ser. No. 502,248
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351

243,925
WALL PLATE
Joan Klatil Creamer, Warwick, R.I., assignor to General Electric Company
Filed Nov. 18, 1974, Ser. No. 524,914
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351

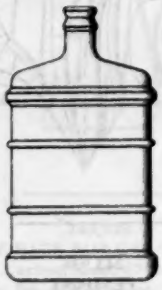
243,926
UTILITY POLE SIDE INSULATOR BRACKET
Joseph W. Dimiceli, San Rafael, and Edgardo R. Labra, Corte Madera, both of Calif., assignors to Utilities Hardware, Inc., Richmond, Calif.
Filed Apr. 5, 1976, Ser. No. 673,425
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—364



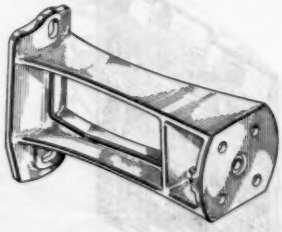
243,927
UTILITY POLE SQUARE INSULATOR BRACKET
Joseph W. Dimiceli, San Rafael, and Edgardo R. Labra, Corte Madera, both of Calif., assignors to Utilities Hardware, Inc., Richmond, Calif.
Filed Apr. 5, 1976, Ser. No. 673,404
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—364



243,928
BOTTLE
Carl E. Frahm, and Shirley E. Frahm, both of 1428 Oak Meadow Road, Arcadia, Calif. 91106
Filed June 25, 1975, Ser. No. 590,385
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—86



243,929
UTILITY POLE SLANTED INSULATOR BRACKET
Joseph W. Dimiceli, San Rafael, and Edgardo R. Labra, Corte Madera, both of Calif., assignors to Utilities Hardware, Inc., Richmond, Calif.
Filed Apr. 5, 1976, Ser. No. 673,461
Term of patent 14 years
Int. Cl. D08—*08*
U.S. Cl. D8—364

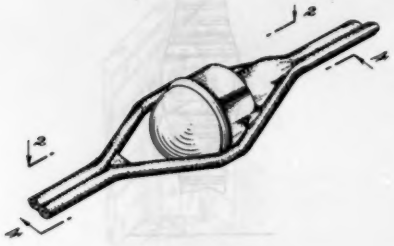


243,930
WRISTWATCH
Arthur Cruse, Dallas, Tex., assignor to E. Gluck Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 497,944, Aug. 16, 1974, Pat. No. Des. 238,341. This application May 12, 1975, Ser. No. 576,480
The portion of the term of this patent subsequent to Jan. 6, 1990, has been disclaimed.
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—38

243,931
SPHERICAL SPIRIT LEVEL
Richard A. Pitkin, and Stanley T. Beale, both of 814 N. Hollywood Way, Burbank, Calif. 91505
Filed Aug. 7, 1975, Ser. No. 602,548
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—69

243,932
FIELD STRENGTH METER
Maurice Warren, Oxnard, Calif., assignor to Vec/Trak Research & Development Corporation, Elmsford, N.Y.
Filed July 1, 1975, Ser. No. 592,111
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—78

243,933
SIGNAL LIGHT FOR EMERGENCY HIGHWAY USE OR THE LIKE
Fred Johns, 19921 Canyon Drive, Yorba Linda, Calif. 92686
Filed July 16, 1975, Ser. No. 596,510
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D10—111

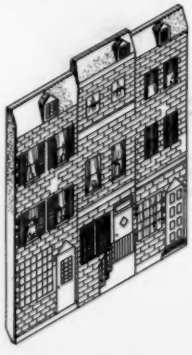


243,934
JEWELRY FINDING OR THE LIKE
Harry Rimberg, 175 Willoughby St., Brooklyn, N.Y. 11201
Filed Sept. 26, 1975, Ser. No. 616,923
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—70

243,935
JEWELRY FINDING OR THE LIKE
Harry Rimberg, 175 Willoughby St., Brooklyn, N.Y. 11201
Filed Sept. 26, 1975, Ser. No. 617,019
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—70

243,936
PENDANT
Mario Balestra, Bassano del Grappa (Vicenza), Italy, assignor to Giovanni Balestra & Figlè S.p.A., Bassano del Grappa (Vicenza), Italy
Filed July 16, 1975, Ser. No. 596,270
Claims priority, application Italy, Jan. 17, 1975, 64203/75
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. 11—81

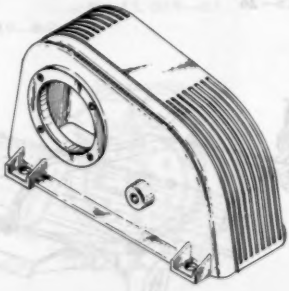
243,937
FACE FOR A PLANTER
Tanya Paretchan, 6508 Enola St., Philadelphia, Pa. 19111
Filed Mar. 11, 1976, Ser. No. 665,912
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—149



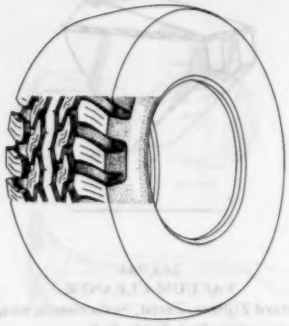
243,938
ARTICLE OF SCULPTURE
Robert H. Aymar, 2888 Rte. 97, Glenwood, Md. 21738
Filed Dec. 9, 1975, Ser. No. 639,203
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—160

243,939
MOBILE RACK FOR GAS CYLINDERS
Albert C. Martin, Carlton, Kans. 67429
Division of Ser. No. 424,721, Dec. 14, 1973, Pat. No. Des. 237,750. This application July 16, 1975, Ser. No. 596,382
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—32

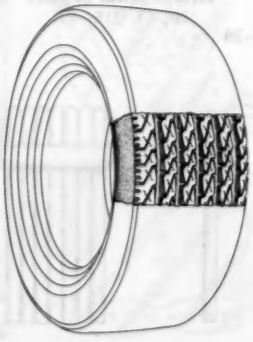
243,940
WINCH HOUSING COVER
Encho Janaki Kuzarov, Milwaukie, Oreg., assignor to Warn Industries, Inc., Kent, Wash.
Filed Sept. 23, 1975, Ser. No. 615,977
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—60



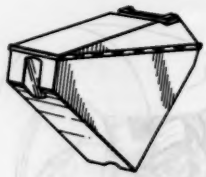
243,941
TIRE
Douglas P. Koeppel, Tallmadge, Ohio, assignor to The Goodyear Tire & Rubber Company
Filed Dec. 29, 1975, Ser. No. 644,671
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—146



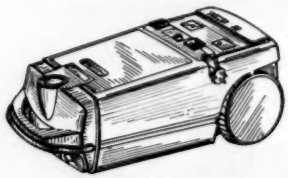
243,942
TIRE
Henri Verdier, Beauregard-L'Eveque, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, Clermont-Ferrand, France
Filed Dec. 4, 1975, Ser. No. 637,738
Claims priority, application France, June 6, 1975, 75.486
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—145



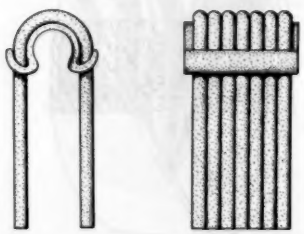
243,943
CONTAINER FOR BICYCLES
James E. Harris, Hermitage, Tenn., and Norman K. Whitaker, Clarkston, Ga., assignors to Aladdin Industries, Incorporated, Chicago, Ill.
Filed Jan. 15, 1976, Ser. No. 649,366
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—158



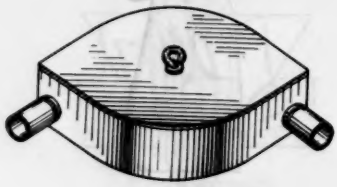
243,944
VACUUM CLEANER
Rudolph Bernard Zijlstra, Zeelst, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Jan. 30, 1975, Ser. No. 545,720
Claims priority, application Switzerland, Aug. 13, 1974, 59278/74
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—52



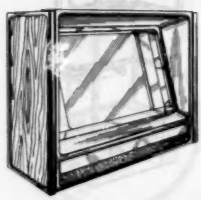
243,945
NYLON COVERED WIRE AGRICULTURAL FLAIL FOR USE ON SUGAR BEET HARVESTING MACHINE
John A. Diehl, Apt. 205 S., 2111 Jeff. Davis Hwy., Arlington, Va. 22202
Filed May 29, 1975, Ser. No. 581,868
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—28



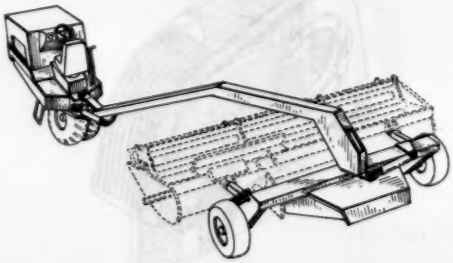
243,946
IDLER CORNER FOR CHAIN TYPE POULTRY FEEDERS
Gerald L. Kitson, 9709 Belding Road, Rockford, Mich. 49341
Division of Ser. No. 271,819, July 14, 1972, abandoned. This application Sept. 20, 1974, Ser. No. 507,610
The portion of the term of this patent subsequent to Aug. 7, 1987, has been disclaimed.
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—199



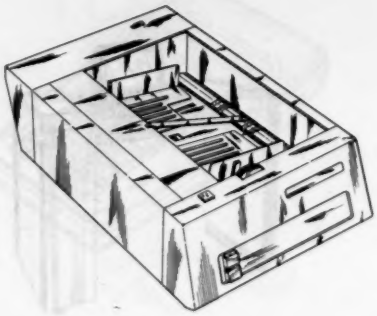
243,947
MICROFILM READER DISPLAY PANEL
Edward R. Wadleigh, Star Route Box 279, Hemet, Calif. 92343
Filed Sept. 19, 1975, Ser. No. 614,988
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—14



243,948
COMBINED TRACTOR AND TRAILING IMPLEMENT FOR SUPPORTING A CROP HEADER
Cecil L. Case, and David P. Fritz, both of Newton, Kans., assignors to Hesston Corporation, Hesston, Kans.
Filed Aug. 21, 1975, Ser. No. 606,530
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—26

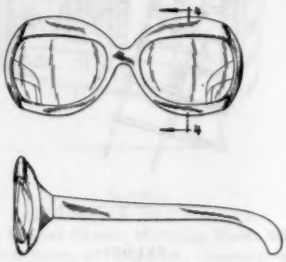


243,949
DOCUMENT FEEDER OR THE LIKE
Richard J. Olson, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Oct. 9, 1975, Ser. No. 620,985
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—31



243,950
MACHINE FOR TEACHING THE MANNER IN WHICH A CLOCK INDICATES TIME
Toyotsugu Ogasawara, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Nov. 24, 1975, Ser. No. 634,791
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—64

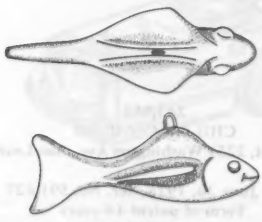
243,951
PAIR OF SPECTACLES
Anthony Shindler, Brookline, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 9, 1976, Ser. No. 656,495
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65



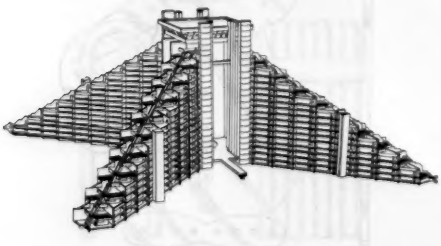
243,952
CHILD'S COMPASS
William J. Bryant, 2251 Washington Ave., San Leandro, Calif. 94577
Filed June 30, 1975, Ser. No. 591,827
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—38

243,953
SAFETY LADDER FOR ABOVE THE GROUND SWIMMING POOL
Peter F. Gannon, Troy, Mich., assignor to Vinyl-Fab Industries, Ferndale, Mich.
Filed Aug. 15, 1973, Ser. No. 388,583
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D25—64

243,954
DOWN RIGGER WEIGHT
Edward M. Raquel, 22500 Thirty-Three Mile Road, Armada, Mich. 48005
Filed Mar. 15, 1976, Ser. No. 667,095
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—30



243,955
BUILDING
Peter R. Kosinski, 215 Bishop St., New Haven, Conn. 06511
Filed June 14, 1974, Ser. No. 479,412
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—5



243,956
DATA PROCESSING CONSOLE
Richard G. Clayton, Detroit; Thomas C. Abrahamsen, Birmingham, both of Mich.; Jack K. Beduhn, Westlake Village, and Norman P. Guetschoff, Jr., Newbury Park, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.
Filed Dec. 19, 1975, Ser. No. 642,493
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—43

243,957
ELECTRONIC CALCULATING MACHINE
Kenichi Matsuda, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Japan
Filed Apr. 25, 1975, Ser. No. 571,703
Claims priority, application Japan, Oct. 23, 1974, 49-37301
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B

243,958
ELECTRONIC CALCULATING MACHINE
Katsumi Jinbo, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Japan
Filed July 16, 1975, Ser. No. 596,416
Claims priority, application Japan, Jan. 18, 1975, 50-2673
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B

243,959
DISK MEMORY
Richard G. Clayton, Detroit; Thomas C. Abrahamsen, Birmingham; John M. Blue, Troy, all of Mich., and Jack K. Beduhn, Westlake Village, Calif., assignors to Burroughs Corporation, Detroit, Mich.
Filed Dec. 19, 1975, Ser. No. 642,486
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—46

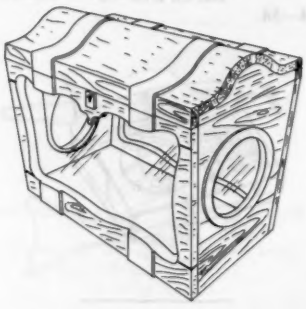
243,960
DIGITAL CONTROLLER FOR MACHINE TOOLS
Gerald V. Roch, Indianapolis, Ind., and James P. Wiles, Olean, N.Y., assignors to Hurco Manufacturing Company, Inc.
Filed Mar. 5, 1975, Ser. No. 555,453
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D15—138

243,961
TELEPHONE INSTRUMENT
Karl Buchin; Werner Grosse; Wolfgang Klein; Alfred Wloch, and Manfred Seide, all of Berlin, Germany, assignors to Deutsche Telephonwerke und Kabelindustrie Aktiengesellschaft, Berlin, Germany
Filed Feb. 7, 1975, Ser. No. 548,152
Claims priority, application Germany, Dec. 12, 1974, 954096
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—58

243,962
CIGARETTE LIGHTER
Kenjiro Goto, Tokyo, Japan, assignor to Mansei Kogyo Kabushiki Kaisha, Saitama, Japan
Filed Mar. 24, 1975, Ser. No. 561,261
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

243,963
OPERATING ASSEMBLY FOR A CIGARETTE LIGHTER
Frank H. Stephens, Jr., Atlanta, Ga., assignor to Scripto, Inc., Atlanta, Ga.
Filed Oct. 14, 1975, Ser. No. 622,114
Term of patent 3.5 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

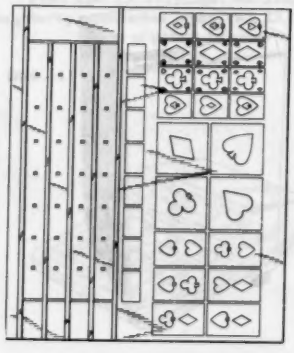
243,964
VIVARIUM
Danny E. Deaton, Rte 3, Box 362, Pinson, Ala. 35126
Filed May 4, 1976, Ser. No. 683,014
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—1



243,965
DOLL HEAD
Antonieta Chirinos Howard, 6320 Albro Lane, Alexandria, Va. 22312
Filed July 15, 1975, Ser. No. 596,061
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

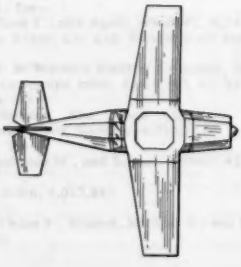
243,966
DOLL
Betty Burt, 6987 York Road, Parma Heights, Ohio 44130, and Virginia A. Dart, 8050 Elmhurst Drive, Brecksville, Ohio 44141
Filed Mar. 11, 1976, Ser. No. 665,881
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

243,967
GAME BOARD
Henty Venn Money, 254 Marine Parade, Swanbourne, Australia
Filed Dec. 31, 1974, Ser. No. 537,858
Claims priority, application Australia, July 8, 1974, 65291/74
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS

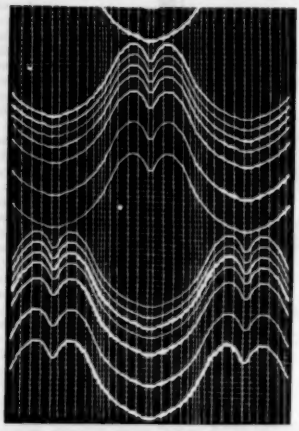


243,968
GOLF CLUB HEAD
Richard Whittaker, 302 S. Croton Ave., New Castle, Pa. 16101
Filed Sept. 8, 1975, Ser. No. 611,353
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

243,969
TOY AIRPLANE
Larry Pitts, 669 W. Campus Circle, Fort Lauderdale, Fla. 33312
Filed May 21, 1975, Ser. No. 579,413
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 HH

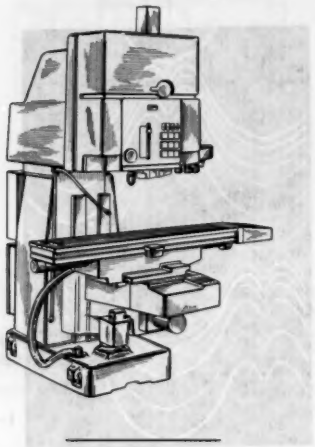


243,970
CURTAIN MATERIAL (NO. 505)
Peter E. Schroeder, c/o Gardisette International AG, Pilatusstrasse 38, Lucerne, Switzerland
Filed Mar. 20, 1975, Ser. No. 560,523
Claims priority, application Germany, Oct. 25, 1974, 706
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D47—6 E

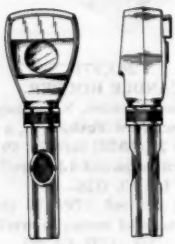


243,971
CANDLE HOLDER
Chauncey T. Thompson, Trenton, N.J., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest
Filed June 27, 1975, Ser. No. 591,086
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D48—2

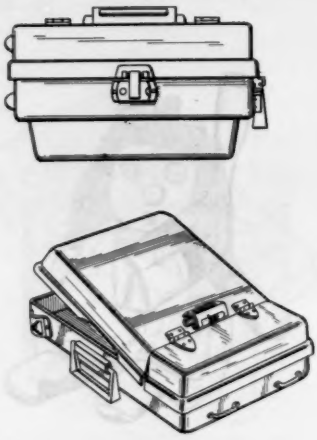
243,972
MILLING MACHINE
George A. Kucyna, Yonkers, and Anthony P. Montalbano, Glen Cove, both of N.Y., assignors to Autonumerics, Inc., Hauppage, N.Y.
Filed Jan. 22, 1976, Ser. No. 651,291
Term of patent 14 years
Int. Cl. D15—09
U.S. Cl. D15—131



243,973
RETINOSCOPE
Arthur J. Pulos, Fayetteville, and Paul B. Sweeney, Syracuse, both of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.
Filed Mar. 1, 1976, Ser. No. 662,602
Term of patent 14 years
Int. Cl. D24—02
U.S. Cl. D24—17



243,974
COMBINED BRIEFCASE AND CLIPBOARD
Charles W. Tracy, Tallahassee, Fla., assignor to Sargent-Sowell, Inc., Grand Prairie, Tex.
Filed June 3, 1974, Ser. No. 476,003
Term of patent 14 years
Int. Cl. D3—01
U.S. Cl. D87—5 B



243,975
WATERTIGHT CONTAINER FOR SMALL PERSONAL ARTICLES
Bjorn Olof Hjalmar Persson, Bergsgatan 21 B, S-832 00 Froson, Sweden
Filed Apr. 30, 1975, Ser. No. 573,001
Claims priority, application Sweden, Oct. 31, 1974, 741792
Term of patent 14 years
Int. Cl. D3—02
U.S. Cl. D87—1 R

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 5TH DAY OF APRIL, 1977

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Christiaens Societe Anonyme: *See*—
Vanhoof, Pierre M.; and Clarebout, Pierre M., 4,016,284.

AB Volvo Penta: *See*—
Pichl, Heinz, 4,015,429.

Abbott Machine Co., Inc.: *See*—
Abbott, Samuel L., 4,015,316.

Abbott, Samuel L., to Abbott Machine Co., Inc. Combination tension and slub catching device. 4,015,316, Cl. 28-64.000.

Abe, Eiji; Ohta, Takahisa; and Urata, Mitsuharu, to Shinko Electric Co., Ltd.; and Fuji Photo Film Co., Ltd. Automatic film retrieval system and method therefor. 4,016,406, Cl. 235-92.0MP.

Aberer, James B., to Rival Manufacturing Company. Snap together switch assembly. 4,016,387, Cl. 200-303.000.

Abermeth, Hubert: *See*—
Ganter-Ullmann, Karl; Neussel, Paul; Abermeth, Hubert; Wahnschaffe, Jurgen; and Klier, Heiner, 4,015,485.

Aboaf, Joseph Adam; Broadie, Robert Wallace; and Pliskin, William Aaron, to International Business Machines Corporation. Integrated circuit isolation structure and method for producing the isolation structure. 4,016,017, Cl. 148-187.000.

Abrahamsen, Thomas C., to Burroughs Corporation. Floor structure for the environment of a modular computer system. 4,016,357, Cl. 174-48.000.

Abramishvili, Roza Isaakovna: *See*—
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.

Access Control Systems Pty. Ltd.: *See*—
Horvath, Stephen, 4,015,869.

ACF Industries, Incorporated: *See*—
Rollins, Dallas W.; Randolph, Robert W.; and Garner, Gerald D., 4,015,751.

Acheson, Willard P.; Huygen, Hans H. A.; and Trump, Robert P., to Gulf Research & Development Company. Shale oil recovery process. 4,015,664, Cl. 166-259.000.

ACR Electronics, Inc.: *See*—
Williams, Wayne E., 4,015,810.

Adachi, Yoshiharu, to Aisin Seiki Kabushiki Kaisha. Brake control device. 4,015,881, Cl. 303-114.000.

Adams, George F. Reactor process and apparatus for continuous polymerization. 4,016,348, Cl. 526-293.000.

Adams, James S.; and Cutler, Charles W., to Hill-Rom Company, Inc. Ground-test circuit with minimal ground current. 4,016,489, Cl. 324-51.000.

Adams, Kenneth Douglas: *See*—
Herr, John Addison; Jaffe, Wolfgang; Dob, Allan Matthew; Minalga, Philip Francis; Adams, Kenneth Douglas; and Herron, William Lee, 4,016,441.

Adams, Sally Lee: *See*—
Persinski, Leonard J.; Cook, Michael M.; and Adams, Sally Lee, 4,015,991.

Adler, Norman; and Camin, Leopoldo Lazaro, to New England Nuclear Corporation. Bone seeking technetium 99m complex. 4,016,249, Cl. 424-1.000.

Advanced Decision Handling, Inc.: *See*—
Hall, Arthur D., III, 4,015,366.

Aero-Dyne Manufacturing, Inc.: *See*—
Culpepper, Clifford, Jr., 4,015,927.

AES Technology Systems, Inc.: *See*—
Evans, Robert H.; and Wochinski, Ronald F., 4,015,523.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
Galland, Jacques; Boutard nee Gabillet, Dominique; and Chene, Jacques, 4,015,950.

Agett, Albert H.: *See*—
Cooke, William C.; and Agett, Albert H., 4,016,324.

Ahiko, Isami, to Suzuei Co. Ltd. Floatable oil fence. 4,015,431, Cl. 61-1.00F.

Ahmed, Nazeer, to Western Electric Company, Inc. Formation and utilization of compound billet. 4,015,765, Cl. 228-131.000.

Aihara, Kazuma: *See*—
Kajiura, Atsusuke; Aito, Yuzo; Sugiyama, Atsushi; Tamura, Hiroki; and Aihara, Kazuma, 4,016,112.

Air Filters, Inc.: *See*—
Howard, Laurence M.; and Schaaf, Robert, 4,015,961.

Air LB: *See*—
Blanchet, Lucien, 4,015,889.

Airco, Inc.: *See*—
Pietrucha, Victor F.; Minard, Michael E.; and Ozmec, Gordon J., 4,015,440.

Airwick Industries, Inc.: *See*—
Hennart, Claude, 4,015,970.

Aisin Seiki Kabushiki Kaisha: *See*—
Adachi, Yoshiharu, 4,015,881.

Aito, Yuzo: *See*—
Kajiura, Atsusuke; Aito, Yuzo; Sugiyama, Atsushi; Tamura, Hiroki; and Aihara, Kazuma, 4,016,112.

Ajinomoto Co., Inc.: *See*—
Mitsugi, Koji; Sano, Konosuke; Yokozeki, Kenzo; Yamada, Kazuhiko; Noda, Ichiro; Kagawa, Teruhiko; Eguchi, Chikahiko; Yasuda, Naohiko; Tamura, Fumihide; and Togo, Kazushi, 4,016,037.

Akbaev, Abdi; and Ezhova, Vera Vasilievna. Anthelmintic thiodiphenylamine cupric chloride complex salt. 4,016,272, Cl. 424-245.000.

Akeson, Richard C.; and Hockenbury, Robert W., to Twin Disc, Incorporated. Digital electronic controller for power transmission. 4,015,488, Cl. 74-866.000.

Aktiebolaget Electrolux: *See*—
Andersson, Bror Lennarth; and Fahlvik, Nils Arne, 4,015,935.
Jonsson, Arne Ingvar; Malmstrom, Olov Valdemar; and Tibell, Bengt Gunnar Julius, 4,015,614.

Aktiebolaget SAMEFA: *See*—
Horvallius, Torgny William, 4,015,339.

Aktiengesellschaft Adolph Saurer: *See*—
Oesterle, Gerhard, 4,015,640.

Aktieselskabet Brodrene Hartmann: *See*—
Petersen, Jorgen Nilaus, 4,015,766.

Akustik Miljo AB: *See*—
Siden, Lars, 4,015,867.

Akzo N.V.: *See*—
Luthardt, Hans J., 4,016,312.

Akzona Incorporated: *See*—
Oosterwijk, Hendrik Harm Jannes, 4,016,187.
Schuurs, Antonius H. W. M.; Van Weemen, Bauke K.; and Wolters, Gerrit, 4,016,043.
van der Burg, Willem Jacob, 4,016,161.

Albert-Frankenthal AG: *See*—
Schroder, Peter, 4,015,840.

Albrecht, Gerhard: *See*—
Eyb, Wolfgang; Soffge, Friedhelm; Piper, Ortwin; and Albrecht, Gerhard, 4,015,303.

Albrecht, Harry Allen; and Plati, John Thomas, to Hoffmann-La Roche Inc. Sulfacytosine derivatives. 4,016,267, Cl. 424-229.000.

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Alcan Aluminum Corporation: *See*—
Daver, Edul M., 4,015,947.

Alewelt, Wolfgang: *See*—
Bockmann, August; Wulff, Claus; Vernaleken, Hugo; Alewelt, Wolfgang; and Hucks, Uwe, 4,016,190.

Alexander, Danrick W., to Continental Oil Company. Hydraulic materials handling system. 4,015,625, Cl. 137-355.200.

Alexander, William; Causa, Alfredo Guillermo; and Fraser, James Girvan, to Millhaven Fibers, Ltd. Process for the control of carboxyl end groups in fiber-forming polyesters. 4,016,142, Cl. 260-75.00T.

Alfa-Laval AB: *See*—
Thylefors, Henric Wilhelm, 4,015,773.

Alison Control Inc.: *See*—
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Allen, Donald J.: *See*—
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Allied Chemical Corporation: *See*—
Yeh, Chuen Y.; and Bohn, Francis L., 4,016,213.

Allis-Chalmers Corporation: *See*—
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Alps Electric Co., Ltd.: *See*—
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Alside, Inc.: *See*—
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Pharriss, Bruce B.; Erickson, Ross R.; and Tillson, Stephen A., 4,016,270.

Amagami, Keizo; Kobayashi, Takao; Ogino, Yoshio; and Kiuchi, Mitsuyuki, to Matsushita Electric Industrial Co., Ltd. Induction heating apparatus with protective circuit arrangement. 4,016,390, Cl. 219-10.490.

Amagami, Keizo: *See*—
Kobayashi, Takao; Amagami, Keizo; Mizukawa, Takumi; and Toyooka, Tadao, 4,016,392.

Amano, Haruyuki: *See—*
Hayashida, Yoshihiro; and Amano, Haruyuki, 4,015,693.
Ambardanishvili, Tristan Silovanovich; Dundua, Vakhtang Justinovich; and Kolomiitsev, Mikhail Alexandrovich. Source of ionizing radiation. 4,016,095, Cl. 252-301.10R.
Amdahl Corporation: *See—*
Beall, Robert J.; Buelow, Fred K.; and Zasio, John J., 4,016,463.
American Color & Chemical Corporation: *See—*
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American Hospital Supply Corporation: *See—*
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St. Amand, Elmer F.; and Thornbury, Thomas R., 4,015,401.
American Mobile Corporation: *See—*
Lenz, Leonard L., 4,015,685.
American Nucleonics Corporation: *See—*
Sauter, Walter A.; and Martin, David R., 4,016,516.
American Optical Corporation: *See—*
Deeg, Emil W.; and Krohn, David A., 4,015,965.
American Pelletizing Corporation: *See—*
Perrine, Paul M., 4,015,973.
American Pulverizer Company: *See—*
Miller, Donald G., 4,015,783.
AMF Incorporated: *See—*
Arthur, Ronald H., 4,016,378.
Ammco Tools, Inc.: *See—*
Kamin, Arthur; Evans, Clifford A.; and Freborg, Lehner C., 4,015,481.
Amos, Richard Wayne, to Van Zandt Precision Products, Inc. Cartridge storing and loading device for a revolver. 4,015,358, Cl. 42-87.000.
AMP Incorporated: *See—*
Roland, John Thomas, 4,016,461.
Amsted Industries Incorporated: *See—*
Ashley, Allan J., 4,015,908.
Amtex, Inc.: *See—*
Johnson, Daniel W., 4,015,444.
Analog Devices, Inc.: *See—*
Pastoriza, James J., 4,016,559.
Anders, Herbert; Bullens, Antonius Adrianus Maria; Groot, Jan; Otten, Johannes Henricus Bernardus; Stoof, Hendrikus Christiaan Josephus; and Vloemans, Carolus Leopoldus, to U.S. Philips Corporation. High-voltage transformer. 4,016,478, Cl. 321-27.00R.
Anderson, Arnold L., to Michigan Chemical Corporation. Plastic compositions. 4,016,136, Cl. 260-45.90R.
Anderson, Arnold L.; and Nulph, Robert J., to Michigan Chemical Corporation. Plastic compositions. 4,016,137, Cl. 260-45.75R.
Anderson, Arnold L., to Michigan Chemical Corporation. Plastic compositions. 4,016,138, Cl. 260-45.75R.
Anderson, Arnold L.; and Nulph, Robert J., to Michigan Chemical Corporation. Plastic composition comprising acrylonitrile-butadiene-styrene polymer, a bis-phenoxy flame retardant and a flame retardant enhancing agent. 4,016,139, Cl. 260-45.75R.
Anderson, Carl Clement; and Dowbenko, Rostyslaw, to PPG Industries, Inc. Mercaptan blocked thermosetting copolymers. 4,016,332, Cl. 428-500.000.
Anderson, James C. Caged nut. 4,015,650, Cl. 151-41.760.
Anderson, John Dale; and Lutz, Bruce Leo. Stack-forming machine having tilting press. 4,015,520, Cl. 100-215.000.
Anderson, Perry W.: *See—*
Glabe, Elmer F.; Anderson, Perry W.; and Laftsidis, Stergios, 4,016,294.
Anderson, Richard L.; Clifton, Jack K.; Masi, James V.; and Merrin, Seymour, to Innotech Corporation. Photovoltaic heterojunction device employing a wide bandgap material as an active layer. 4,016,586, Cl. 357-2.000.
Andersson, Bror Lennarth; and Fahlvik, Nils Arne, to Aktiebolaget Electrolux. Method and apparatus for feeding and discharging a continuously operating autoclave. 4,015,935, Cl. 21-2.000.
Andersson, Lars Åke Vilhelm. Firearm bolt. 4,015,357, Cl. 42-16.000.
Ando, Akiko: *See—*
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Andress, Harry J., to Mobil Oil Corporation. Organic compositions containing borate and phosphonate derivatives as detergents. 4,016,092, Cl. 252-32.500.
Andrews, Donald. Hook baiting machine. 4,015,359, Cl. 43-4.000.
Anglian Water Authority: *See—*
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Anikanov, Nikolai Ivanovich; Baburin, Evgeny Arkadievich; Grachev, Leonid Pavlovich; Zax, Grigory Iosifovich; Radutsky, Grigory Avramovich; Frumkin, Mikhail Evseevich; and Kheifets, Rafail Efimovich. Apparatus for bundling stacks of newspapers. 4,015,404, Cl. 53-218.000.
Anikina, Svetlana Jurievna: *See—*
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.
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Ante, Gunther: *See—*
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Aono, Shigeo; Ikeura, Kenji; and Hata, Yoshitaka, to Nissan Motor Co., Ltd. Spark-advance control apparatus for internal combustion engine. 4,015,565, Cl. 123-117.00D.
Aono, Taiji: *See—*
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Aono, Toshiaki: *See—*
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Aoshima, Takaaki: *See—*
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Apple, Garrett Gordon, Jr., to North Electric Company. Framing circuit for digital receiver. 4,016,368, Cl. 179-15.0BS.
Apple, Glenn Dwight, to Du Pont de Nemours, E. I., and Company. Sampling probe and method. 4,015,479, Cl. 73-422.00R.
Appleman, Milo Don: *See—*
DeSantis, Stanislao A., 4,016,296.
Appleton, Frank. Credit card verifier. 4,016,404, Cl. 235-61.70B.
Aquasol, Inc.: *See—*
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Arai, Hiroshi: *See—*
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Arai, Soichi: *See—*
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Araki, Tadashi: *See—*
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Argyris, Pericles Alexandre; and Williams, William Randolph, to Rockwell International Corporation. Stop means for valves. 4,015,817, Cl. 251-288.000.
Arizona Chemical Company: *See—*
Wojcik, Ronald Thomas; and Ruckel, Erwin Richard, 4,016,346.
Arkind, Kenneth D.; and Geddry, Bernard L., to Sanders Associates, Inc. Constant beam width antenna reflector. 4,016,570, Cl. 343-781.00R.
Arlt, Dieter: *See—*
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Armstrong, Allen E. Bicycle brake with force modifying means. 4,015,690, Cl. 188-24.000.
Armstrong Cork Company: *See—*
Bohrn, Walter J., 4,016,316.
Nute, Ernest B., Jr.; and Wasson, Kenneth L., 4,015,811.
Armstrong, Lee R., to United Technologies Corporation. Sub-cyclic measurements of speed and time for internal combustion engine horsepower indication. 4,015,467, Cl. 73-116.000.
Armstrong, Lee R.: *See—*
Stick, Philip P.; Willenbecher, James F.; and Armstrong, Lee R., 4,015,466.
Arnold, Philip M.; and Malick, Emil A., to Phillips Petroleum Company. Method of heating microbial cells. 4,016,300, Cl. 426-429.000.
Arthaud, Jacques. Device for mounting on a machine to allow the machine to be used as a saw. 4,015,499, Cl. 83-752.000.
Arthur, Ronald H., to AMF Incorporated. Detent means for simplified slide switch. 4,016,378, Cl. 200-16.00D.
Arzberger, William A.; and Lalumiere, Edward J., to Jet Spray Cooler, Inc. Hot coffee dispenser. 4,015,749, Cl. 222-70.000.
Asaba, Masayoshi: *See—*
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Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
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Asai, Takeji; and Yamazumi, Kaishu, to Kabushiki Kaisha Fujikoshi. Method for heat treatment of high alloy steel in a nonexplosive atmosphere. 4,016,011, Cl. 148-16.000.
Asano, Osamu: *See—*
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Ashikawa, Mikio: *See—*
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Ashley, Allan J., to Amsted Industries Incorporated. Multiple-piece crankshaft. 4,015,908, Cl. 403-274.000.
Askew, Herbert Frank: *See—*
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Aspro, Inc.: *See—*
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Atherton, Frank Ratcliffe; Hall, Michael John; Hassall, Cedric Herbert;

Ringrose, Peter Stuart; and Lambert, Robert Wilson, to Hoffmann-La Roche Inc. Peptide derivatives of phosphonic and phosphinic acids and intermediates therefor. 4,016,148, Cl. 260-112.50R.

Atomic Energy of Canada Limited: *See—*
Pauluis, Gerard J. C. A.; and Miller, Alistair I., 4,015,944.

Aubin, Bernard: *See—*
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Auto Specialties Manufacturing Company: *See—*
Graafsma, Richard S.; and Nehrig, R. Harlan, 4,015,825.

Autocrat Corporation: *See—*
Wirth, George H.; and Derby, Sherwin L., 4,015,579.

Automobiles Peugeot: *See—*
Stcherbatcheff, Georges; and Lefeuvre, Andre, 4,015,870.

Avazov, Teshabai Nazarovich: *See—*
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.

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Azurdata, Inc.: *See—*
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Azure, Leo L., to Azurdata, Inc. Electronic notebook for use in data gathering, formatting and transmitting system. 4,016,542, Cl. 340-172.500.

B. F. Goodrich Company, The: *See—*
Kim, Heung Tai, 4,015,833.
Nehmey, Sam Donald, 4,015,926.
Wanstreet, Gregory E., 4,015,623.
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Bachner, Ernst: *See—*
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Bacon, Roger J., to FMC Corporation. Mower with shock mounts. 4,015,407, Cl. 56-255.000.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See—*
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Bagg, Greville Euan Gordon; Cook, John; Dingle, Leslie Ernest; Edwards, Henry; and Ziebland, Hans, to National Research Development Corporation. Manufacture of composite materials. 4,016,031, Cl. 162-213.000.

Baggaley, Jon Clemens, to Tonecraft Limited. Dispensing and display device. 4,015,885, Cl. 312-42.000.

Bahrman, Clinton F.; and Welch, Thomas Ross, to Bahrman, Clinton F. Shock absorber lock. 4,015,862, Cl. 280-754.000.

Baierl, Kenneth W., to Flambeau Paper Company. Chemical concentration by adsorption. 4,016,180, Cl. 260-347.900.

Baiocchi, Leandro, to Aziende Chimiche Riunite Angelini Francesco A.C.R.A.F. S.p.A. 4-Acetamidophenyl-p-isobutyl hydratropate. 4,016,197, Cl. 260-477.000.

Baker, Clinton F. Combined sickle guard unit and attachment mounting means. 4,015,409, Cl. 56-312.000.

Baker, Clinton F. Hay loader. 4,015,726, Cl. 214-77.00R.

Baker, Dennis Stanley; and Davies, Glyndwr John, to Glacier Metal Company Limited, The. Plain bearings. 4,015,949, Cl. 428-653.000.

Balda-Werke: *See—*
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Baldry, Peter R.: *See—*
Roth, Howard; Baldry, Peter R.; Kaufman, Harold B., Jr.; McCarthy, John P.; and Wallenfels, Kurt, 4,015,518.

Balekjian, Garbis S. Phosphorescent display system. 4,016,450, Cl. 315-149.000.

Balke, Karl Heinz. Domestic or tradesman's knife. 4,015,331, Cl. 30-355.000.

Ball, Henry F. Stabilizing subsoil moisture under light structures. 4,015,432, Cl. 61-35.000.

Barannik, Valery Pavlovich; and Kolesnikov, Arkady Georgievich. Method of producing fertilizers from sea-like waters. 4,015,971, Cl. 71-31.000.

Barker, Noble G.; Corwin, John E.; Myers, Jimmy D.; and Yates, Jan B., to Caterpillar Tractor Co. Material handling apparatus. 4,015,728, Cl. 214-138.00G.

Barr, Irwin R., to United States of America, Air Force. High density armor piercing projectile. 4,015,528, Cl. 102-52.000.

Barrett, William G.: *See—*
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Law, Wendell A.; Barrett, William G.; Priebe, Norman F.; and Wise, Harry D., 4,016,548.

Barry, Anthony Dermot, to John A. Wood Limited. Construction of tank. 4,015,384, Cl. 52-224.000.

Bartch, Donald Walter: *See—*
Deal, Samuel Broughton; and Bartch, Donald Walter, 4,016,363.

Bartenfeld, William Chelsea; Bryant, Clifford Aldene; and Newman, Wilbur Koontz, Sr., to West Point Pepperell, Inc. Apparatus and method for selective multi-color dyeing of individual yarns and producing therefrom a predetermined complex design in a tufted carpet. 4,015,550, Cl. 112-79.00A.

Barton, Robert M.: *See—*
Parquet, Donald J.; Pedersen, Carl O.; and Barton, Robert M., 4,015,729.

BASF Aktiengesellschaft: *See—*
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Battelle Memorial Institute: *See—*
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Battigelli, Jean A.: *See—*
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Levecque, Marcel; Battigelli, Jean A.; and Plantard, Dominique, 4,015,964.

Bauer, Rudolf; and Wick, Helmut, to Boehringer Ingelheim GmbH. Spray compositions for inhalation therapy of bronchial disorders. 4,016,279, Cl. 424-265.000.

Baumgartner, Hans U.: *See—*
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Baumgartner Papiers S.A.: *See—*
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Baur, Robert F.; Comey, David M.; and Robillard, Gene A., to Honeywell Inc. Electromagnetic radiation detector. 4,016,590, Cl. 357-30.000.

Baxter Laboratories, Inc.: *See—*
Martinez, F. Jesus; and Schnell, William J., 4,016,081.

Baxter Travenol Laboratories, Inc.: *See—*
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Bayer Aktiengesellschaft: *See—*
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BBC Brown Boveri & Company Limited: *See—*
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Beach Precision Parts Co.: *See—*
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Beall, Robert J.; Buelow, Fred K.; and Zasio, John J., to Amdahl Corporation. High density multilayer printed circuit card assembly and method. 4,016,463, Cl. 361-383.000.

Beatrice Foods Co.: *See—*
Kasik, Robert L.; and Peterson, Marvin A., 4,016,298.

Beatty, Ronald L.; Kiplinger, Dale V.; and Chilcoat, Bill R., to United States of America, Energy Research and Development Administration. Method for applying pyrolytic carbon coatings to small particles. 4,016,304, Cl. 427-6.000.

Beaty, Thomas, Jr.; and Samander, Asib S. Automatic palletizer method and apparatus. 4,015,723, Cl. 214-6.00P.

Beaty, Thomas, Jr.; and Samander, Asib S. Automatic palletizer method and apparatus. 4,015,732, Cl. 214-152.000.

Beaver, Tony J., to Cervical Traction Company, Inc. (Entire). Portable cervical traction apparatus. 4,015,597, Cl. 128-75.000.

Beck, Allan S.: *See—*
Gutterman, Eric D., 4,016,428.

Beck, Erich. Conversion of plastic waste into extrudable pellets. 4,015,781, Cl. 241-46.110.

Beck, Gunther; and Arlt, Dieter, to Bayer Aktiengesellschaft. Process for preparing trichlorothiazole. 4,016,169, Cl. 260-302.00R.

Beck, James M., to U.S. Cap & Closure, Inc. Spout for swivel-spout dispensing closures. 4,015,756, Cl. 222-534.000.

Beck, Sidney Marion; and Gilmour, Campbell Moore, to Idaho Research Foundation, Inc. Electrolytic field respirometer. 4,016,065, Cl. 204-275.000.

Beckman Instruments, Inc.: *See—*
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Beecham Group Limited: *See—*
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Beecken, Hermann, to Bayer Aktiengesellschaft. Styryl dyestuffs. 4,016,191, Cl. 260-465.00E.

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Bell Telephone Laboratories, Incorporated: *See—*
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Beloit Corporation: *See*—
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Bemis Company, Inc.: *See*—
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Bender Machine Works, Inc.: *See*—
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Bendix Corporation, The: *See*—
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Benjamin, J. Malvern, Jr. Photoplethysmographs. 4,015,595, Cl. 128-2.05V.
Bennett, Robert. Dip tube powder spray control device. 4,015,753, Cl. 222-193.000.
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., to Motorola, Inc. Bus switch coupling for series-coupled address bus sections in a microprocessor. 4,016,546, Cl. 340-172.500.
Benton, Richard Glasscock. Laser beam transport, and method. 4,016,417, Cl. 250-251.000.
Benya, John S., to United States of America, Navy. Fleet angle system and method of level winding. 4,015,798, Cl. 242-157.100.
Beretta, Oscar, to Societe Anonyme a Responsabilite Limitee: Technifil. Containers made in metallic wires. 4,015,743, Cl. 220-19.000.
Bergfelt, Nils H.: *See*—
Small, Edward A.; Edwards, Richard H.; Eufusia, Eugene A.; Clary, Robert M.; and Bergfelt, Nils H., 4,015,558.
Bergling, Charles Gunnar Birger, to Esab-Hebe AB. Method and apparatus for conveying metal plates. 4,015,702, Cl. 198-486.000.
Berglund, Kjell; and Nordlund, Signar. Means for changing the position of a load-carrying component of a transport unit. 4,015,735, Cl. 214-313.000.
Bergwerksverband GmbH: *See*—
Munzner, Heinrich; Heimbach, Heinrich; Korbacher, Werner; Feters, Werner; Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, 4,015,956.
Berkowitz, Sidney; and D'Angelo, John, to FMC Corporation. Process for purifying crude cyanuric acid. 4,016,164, Cl. 260-248.00A.
Bernard, Walter. Bicycle storage rack. 4,015,718, Cl. 211-5.
Bernstein, Phillip: *See*—
Toy, Henry; Bernstein, Phillip; and Van der Zwaan, Johan C., 4,015,507.
Berthelon, Jean-Jacques: *See*—
Boschetti, Eugene; Briet, Philippe; Berthelon, Jean-Jacques; and Chabert, Janine, 4,016,285.
Bertram, Johannes; and Wolzenburg, Heinz, to Hoesch Werke Aktiengesellschaft. Center-free one-row wire ball bearing. 4,015,884, Cl. 308-216.000.
Best, Lorne A., to National Element Inc. Electrical heating element. 4,016,403, Cl. 219-550.000.
Betensky, Ellis I., to Fimacon Associates. Illumination system for continuous path enlarger. 4,015,902, Cl. 355-60.000.
Bethlehem Steel Corporation: *See*—
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Bidwell, Robert E.: *See*—
Kurtz, Leonard D.; and Bidwell, Robert E., 4,015,603.
Biggs, Lester G., to United States of America, Air Force. Reusable shipping container assembly. 4,015,710, Cl. 206-386.000.
Bihrle, William, Jr. Aerodynamic spin control device for aircraft. 4,015,800, Cl. 244-76.00R.
Bindicator Company: *See*—
Levine, Walter E., 4,015,319.
Bio-Rad Laboratories, Inc.: *See*—
Lewin, Nathan; and Mangiardi, Vito J., 4,015,939.
Biological Developments, Inc.: *See*—
Soares, James R., 4,016,146.
Birdwell, J. C., to Midcon Pipeline Equipment Co. System for laying pipe. 4,016,393, Cl. 219-59.000.
Birks, Laverne S.; and Fatemi, Mohammad, to United States of America, Navy. Multielectrode grid for aligning polarized particles such as asbestos. 4,016,456, Cl. 361-288.000.
Bishop, Everett Reece; and Leroux, Marcel Henri, to General Electric Company. Apparatus for converting a plurality of signals representative of digital bits of information to an analog signal. 4,016,558, Cl. 340-347.0DA.
Bitzer, Diethelm; and Lohmann, Dieter, to Ciba-Geigy Corporation. Process for producing diffusion layers of carbides, nitrides and/or carbonitrides. 4,016,013, Cl. 148-16.500.
Blachly, Charles H.: *See*—
Deitz, Victor R.; and Blachly, Charles H., 4,016,242.
Blackwell, Curtis R., to Reeves Roofing Equip. Co., Inc. Tar kettle. 4,015,588, Cl. 126-343.50A.
Blahak, Johannes; Muller, Erwin; and Richert, Karl Hartwig, to Bayer Aktiengesellschaft. Polyurethanes based on aromatic polyamines. 4,016,143, Cl. 260-77.5AM.
Blair, Robert B.: *See*—
Webb, Harry B.; Lee, James W.; and Blair, Robert B., 4,015,538.
Blanchet, Lucien, to Air LB. Shunt for providing a direct electrical connection. 4,015,889, Cl. 339-19.000.
Blaupunkt-Werke GmbH: *See*—
Haas, Dieter, 4,016,519.
Blodgett, Fredrick M., Jr.; and Schuyler, Peter B., to General Electric Company. Burst dispersion control. 4,015,508, Cl. 89-12.000.
Boberg, Gunnar: *See*—
Riede, Gerhard; and Boberg, Gunnar, 4,016,082.
BOC Limited: *See*—
Hall, Robert Gilmore, 4,015,780.
Bockmann, August; Wulff, Claus; Vernaleken, Hugo; Alewelt, Wolfgang; and Hucks, Uwe, to Bayer Aktiengesellschaft. Process for the preparation of diarylcarbonates. 4,016,190, Cl. 260-463.000.
Boehmer, Wolfgang: *See*—
Sommer, Neithart; Cuntze, Gerhard; and Boehmer, Wolfgang, 4,016,347.
Boehringer, Andreas, to Robert Bosch G.m.b.H. Protective system for intermittently operating semiconductor switch. 4,016,459, Cl. 361-88.000.
Boehringer Ingelheim GmbH: *See*—
Bauer, Rudolf; and Wick, Helmut, 4,016,279.
Eberhardt, Hans; and Brickl, Rolf Stefan, 4,016,287.
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, 4,016,202.
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, 4,016,286.
Wetzel, Bernd; Woitun, Eberhard; Maier, Roland; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,016,263.
Boehringer Mannheim G.m.b.H.: *See*—
Fauland, Erich; Kampe, Wolfgang; Stach, Kurt, deceased; Plattner, Werner, executor; Stork, Harald; and Dietmann, Karl, 4,016,262.
Bogdanova, Nadezhda Sergeevna: *See*—
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.
Bohn, Francis L.: *See*—
Yeh, Chuen Y.; and Bohn, Francis L., 4,016,213.
Bohrn, Walter J., to Armstrong Cork Company. Yarn-unraveling resistance in carpet. 4,016,316, Cl. 428-85.000.
Boise Cascade Corporation: *See*—
Ellerbrock, Donald H.; and Hough, Robert J., 4,016,311.
Hearon, William Montgomery; Witte, John F.; and Lo, Cheng Fan, 4,016,207.
Boissier, Pierre, to Usines et Acieries de Sambre et Meuse. Manhole assembly with removable cover, especially for a carriageway. 4,015,373, Cl. 52-20.000.
Bokros, Jack C.; and Slivenko, Victor, to General Atomic Company. Blood access device. 4,015,601, Cl. 128-214.00R.
Bolle, Warren Robert: *See*—
Vroom, Henry J.; Bolle, Warren Robert; Schneider, Herbert; and Swerdling, Burton, 4,015,586.
Bond, John Alan; Cheyne, George Martin Frazer; and Rayner, Adrien Patrick, to Imperial Chemical Industries Limited. Explosive charge. 4,015,526, Cl. 102-21.600.
Bond, John W., Jr., to United States of America, Army. Hypervelocity spallators. 4,015,535, Cl. 102-92.300.
Bonnema, Jentje; and Simon, Henri J. H., to Stamicarbon N.V. Process for recovering ammonium sulphate from aqueous solutions of ammonium sulphate which contain organic compounds. 4,015,946, Cl. 23-300.000.
Booth, Raymond E., to Sam Stein Associates, Inc. Process of coating food with particulate material. 4,016,299, Cl. 426-293.000.
Borden, George Wayne: *See*—
Trecker, David John; Borden, George Wayne; and Smith, Oliver Wendell, 4,016,059.
Bordiga, Alejandro Lorenzo Carlos. Device for propelling boats. 4,015,556, Cl. 115-39.000.
Borg-Warner Corporation: *See*—
Mathews, George P., 4,015,692.
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich. Electric hammer. 4,015,671, Cl. 173-117.000.
Borkat, Franklin R.: *See*—
Silva, John; Garrett, Robert A.; Borkat, Franklin R.; and Young, Frank, 4,015,677.
Bormann, Dieter; Knabe, Bernd; Schrinner, Elmar; and Worm, Manfred, to Hoechst Aktiengesellschaft. Acylamino-cephem-carboxylic acids containing an amidino or guanidino group in the molecule. 4,016,159, Cl. 260-243.00C.
Borrow, Edgar W. Liquid dispensing apparatus. 4,015,646, Cl. 141-34.000.
Boschetti, Eugene; Briet, Philippe; Berthelon, Jean-Jacques; and Chabert, Janine, to Lipha, Lyonnaise Industrielle Pharmaceutique. Acetic acid derivative having choleretic and anti-inflammatory activity. 4,016,285, Cl. 424-283.000.
Bosma, Rumoldus Matthijs Marinos Johannes: *See*—
Leurs, Gerardus Cornelis; Bosma, Rumoldus Matthijs Marinos Johannes; and Pouw, Theodorus Johannes Antonius, 4,015,754.
Bossert, Friedrich: *See*—
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Bosshard, Hans: *See*—
Rempfler, Hermann; Bosshard, Hans; and Weber, Kurt, 4,016,203.
Bott, John A. Vehicle article carrier. 4,015,760, Cl. 224-42.10D.
Bourree, Guy; and Pontier, Claude, to Societe Generale de Construc-

tions Electriques et Mecaniques (ALSTHOM). Logic passing device for automatic railway piloting. 4,015,807, Cl. 246-187.00B.

Boutard nee Gabillet, Dominique: *See—*
Galland, Jacques; Boutard nee Gabillet, Dominique; and Chene, Jacques, 4,015,950.

Bovio, Michele: *See—*
Giolitti, Nicolo; and Bovio, Michele, 4,016,602.

Bower, Allen M., to Emco Wheaton Inc. Pressure relief valve. 4,015,627, Cl. 137-494.000.

Bowmar Canada Limited: *See—*
Gale, Geoffrey N.; Colbourne, Edwin Denis; and Hollins, Michael J., 4,016,449.

Bradley-Moore, Patrick Ralph. Nuclear medicine system for imaging radiation. 4,015,592, Cl. 128-2.00A.

Bradley, Stevan D., to GTE Automatic Electric Laboratories Incorporated. Unmatched field effect transistors providing matched voltage-controlled resistances. 4,016,481, Cl. 323-16.000.

Bramley, Jenny, to United States of America, Army. Optoelectronic means for one-dimensional integral transforms of two dimensional information. 4,016,413, Cl. 235-181.000.

Brammer, Klaus: *See—*
Kunze, Lutz; Knapp, Kurt; and Brammer, Klaus, 4,015,338.

Brand, Harold E. Support stanchion. 4,015,827, Cl. 256-59.000.

Branson Ultrasonics Corporation: *See—*
Shoh, Andrew, 4,016,436.

Brautigam, Rolf: *See—*
Weckenmann, Albert; Haas, Lothar; and Brautigam, Rolf, 4,016,490.

Braytenbah, Andrew S.; and Jaegtnes, Karl O., to Westinghouse Electric Corporation. Electric power plant and turbine acceleration control system for use therein. 4,015,430, Cl. 60-644.000.

Brewer Engineering Laboratories, Inc.: *See—*
Brewer, Given A., 4,015,326.

Brewer, Given A., to Brewer Engineering Laboratories, Inc. Method of mounting a strain gage to a surface. 4,015,326, Cl. 29-460.000.

Brickl, Rolf Stefan: *See—*
Eberhardt, Hans; and Brickl, Rolf Stefan, 4,016,287.

Briet, Philippe: *See—*
Boschetti, Eugene; Briet, Philippe; Berthelon, Jean-Jacques; and Chabert, Janine, 4,016,285.

Brigend Investments Limited: *See—*
Michel, Peter, 4,016,230.

Bright, Arthur A.: *See—*
Garito, Anthony Frank; Heeger, Alan J.; MacDiarmid, Alan G.; Bright, Arthur A.; Cohen, Marshall J.; and Mikulski, Chester M., 4,016,331.

Bright, Robert G. Channel-shaped sealing, finishing and guiding strips. 4,015,398, Cl. 52-716.000.

Bristol-Myers Company: *See—*
Montzka, Thomas Alfred; and Matiskella, John Daniel, 4,016,167.

Bristow, Stephen D.; and Mayer, Steven T., to Atari, Inc. Multiple image positioning control system and method. 4,016,362, Cl. 358-142.000.

British Leyland UK Limited: *See—*
Finch, Peter Molyneux, 4,015,861.

Broadie, Robert Wallace: *See—*
Aboaf, Joseph Adam; Broadie, Robert Wallace; and Pliskin, William Aaron, 4,016,017.

Brock, Phillip J.: *See—*
Rajadhyaksha, Vithal J.; Schroer, Richard A.; Brock, Phillip J.; and Krueger, Earl R., 4,016,223.

Broijl, Berend: *See—*
van der Plas, Nicolaas; and Broijl, Berend, 4,015,413.

Bron, Jean-Daniel: *See—*
Gruetter, Walter; and Bron, Jean-Daniel, 4,015,844.

Brooks, Ronald Robert, to RCA Corporation. GTO circuits. 4,016,433, Cl. 307-252.00C.

Brooks, William T., to United States of America, Air Force. Fuel grain for spherical boost-sustain rocket motor. 4,015,427, Cl. 60-253.000.

Brouthers, Paul E., to Dan Wesson Arms, Inc. Gun sight. 4,015,354, Cl. 42-1.00S.

Brouwer, Gerardus Johannes; and Gerrits, Theodorus Petrus Hubertus, to Brouwer Turf Equipment Limited. Sod undercutting knife. 4,015,666, Cl. 172-19.000.

Brouwer Turf Equipment Limited: *See—*
Brouwer, Gerardus Johannes; and Gerrits, Theodorus Petrus Hubertus, 4,015,666.

Brown, Glenn E. Anaesthesic system. 4,015,598, Cl. 128-188.000.

Brown, John Peter: *See—*
Horner, Patrick James; and Brown, John Peter, 4,016,210.

Brown, Laurence A.; Hagedorn, Floyd T.; and Waltz, Foster V., Jr., to Libbey-Owens-Ford Company. Apparatus for bending glass sheets to relatively sharp angles. 4,015,969, Cl. 65-289.000.

Brown Oil Tools, Inc.: *See—*
Cochran, Chudleigh B., 4,015,662.

Brown, Omar L., to Fraze, Ermal C. Easy-open ecology end. 4,015,744, Cl. 220-269.000.

Brown, Owen J., Jr. Herbicide tank trailer. 4,015,549, Cl. 111-8.000.

Brown, Robert W.: *See—*
Wellman, Russel E.; and Brown, Robert W., 4,016,099.

Brown, Timothy W.: *See—*
DiGioia, Frank A.; and Brown, Timothy W., 4,016,318.

Browning, Charles E.; and Reinhart, Theodore J., Jr., to United States of America, Air Force. Low flow, vacuum bag curable prepreg material for high performance composite systems. 4,016,022, Cl. 156-285.000.

Browning, Scott M.; and Klomp, Gregory F. Writing device incorporating illuminating means. 4,016,414, Cl. 240-6.460.

Brunet, Patrick J. C., to Zuccolo, Rochet & Cie. Metal straps formed by interconnected links. 4,015,423, Cl. 59-82.000.

Brunswick Corporation: *See—*
Fitzner, Arthur O., 4,015,564.

Bryant, Clifford Aldene, to West Point Pepperell, Inc. Dye pan mounting for apparatus for multi-color dyeing of yarn ends. 4,015,453, Cl. 68-202.000.

Bryant, Clifford Aldene: *See—*
Bartenfeld, William Chelsea; Bryant, Clifford Aldene; and Newman, Wilbur Koontz, Sr., 4,015,550.

BTR Industries Limited: *See—*
Howorth, Ronald, 4,015,390.

Buck K.G., Firma: *See—*
Schiessl, Alois; and Krone, Hartmut, 4,015,355.

Budker, Gersh Itskovich; Gaponov, Vasily Alexandrovich; Korabelnikov, Boris Mikhailovich; Krainov, Gennady Sergeevich; Kuznetsov, Sergei Alexandrovich; Kuksanov, Nikolai Konstantinovich; Kondratiev, Vasily Ivanovich; and Salimov, Rustam Abelevich. Charged particle accelerator. 4,016,499, Cl. 328-233.000.

Buebel, Edgar W., Jr., to United States of America, Air Force. Near field antenna boresight alignment apparatus. 4,016,569, Cl. 343-703.000.

Buecheler, Paul, to Sandoz Ltd. Process for the production of aminoanthraquinone compounds. 4,016,182, Cl. 260-371.000.

Buelow, Fred K.: *See—*
Beall, Robert J.; Buelow, Fred K.; and Zasio, John J., 4,016,463.

Bullens, Antonius Adrianus Maria: *See—*
Anders, Herbert; Bullens, Antonius Adrianus Maria; Groot, Jan; Otten, Johannes Henricus Bernardus; Stoof, Hendrikus Christiaan Josephus; and Vloemans, Carolus Leopoldus, 4,016,478.

Bulova Watch Company, Inc.: *See—*
Van Haaften, Egbert, 4,015,422.

Bulten-Kanthal Aktiebolag: *See—*
Schrewelius, Nils G., 4,016,313.

Burgess, John E., to Cleveland Marine Limited. Cable stripping machines with linked cutting and driving wheels. 4,015,497, Cl. 83-425.200.

Buril, Robert T. Hanger device. 4,015,809, Cl. 248-217.200.

Buro Patent AG: *See—*
Pircher, Herbert; and Hambuch, Johannes, 4,015,680.

Burroughs Corporation: *See—*
Abrahamsen, Thomas C., 4,016,357.
Durney, David John, 4,015,764.
Kim, Dongsung Robert, 4,016,409.
Kondur, Nicholas, Jr., 4,015,699.
Templeton, William B., 4,015,701.

Burrous, William R. Screw removal tool. 4,015,490, Cl. 81-180.00R.

Burrows, Ian Edward; and Cheney, Peter Arthur, to Pedigree Petfoods Limited. Proteinaceous food product. 4,016,295, Cl. 426-43.000.

Bush, Kherbert Zhanovich: *See—*
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.

Bushnell, Sherman W., Jr. Portable multi-stage mechanical list. 4,015,686, Cl. 182-148.000.

Business Efficiency Aids, Inc.: *See—*
Zurwelle, Rolf, 4,015,350.

Buss, Dennis Darcy, to Texas Instruments Incorporated. CCD range-doppler processor. 4,016,567, Cl. 343-7.700.

Butler Automatic, Inc.: *See—*
Meihofer, Edward F., 4,015,794.

Buttler, Carl T., to Marquis, Kenneth E. Door lock employing interlocking hinge plates. 4,015,868, Cl. 292-302.000.

Button, John Charles Gladstone, to Chrysler United Kingdom Limited. Vehicle seat assemblies. 4,015,877, Cl. 297-341.000.

Butts, Ernest Otto; and Laurus, Felix F., to Hambro Structural Systems Ltd. Joist. 4,015,396, Cl. 52-690.000.

Byk Gulden Lomberg Chemische Fabrik GmbH: *See—*
Menge, Heinz Gunter; and Klosa, Josef, 4,016,280.

Byrne, John P.: *See—*
Kinsell, Robert C.; Noe, James C.; and Byrne, John P., 4,015,438.

C. Evans & Sons Limited: *See—*
Gostling, Peter Eric, 4,015,395.

C. Itch & Co., Ltd.: *See—*
Hamada, Kenzo; and Uchiyama, Hiroshi, 4,016,118.

Cabaud, Aime, to Comatel - Comptoir European de Materiel Electronique. Apparatus for locating connectors onto a circuit board. 4,015,322, Cl. 29-739.000.

Cadoff, Laurence H., to Westinghouse Electric Corporation. Refractory-oxide-based incandescible radiators and method of making. 4,016,446, Cl. 313-218.000.

Cahill, Bernard S.: *See—*
Heinz, Harro K.; and Cahill, Bernard S., 4,016,502.

Calamera, John: *See—*
Lanni, Michael J.; and Calamera, John, 4,016,469.

Calderara, Reto; Baumgartner, Hans U.; Tichy, Jan; and Sonderegger, Hans C., to Kistler Instrumente AG. Piezoelectric pressure and force transducers or accelerometers. 4,016,437, Cl. 310-8.700.

Cale, Roland E., to Schaefer Equipment Company. Railway car brake rigging linkage. 4,015,697, Cl. 188-209.000.

Calgon Corporation: *See—*
Persinski, Leonard J.; Cook, Michael M.; and Adams, Sally Lee, 4,015,991.

Cameron Iron Works, Inc.: *See—*
Szymczak, Edward J., 4,015,864.
Camin, Leopoldo Lazaro: *See—*
Adler, Norman; and Camin, Leopoldo Lazaro, 4,016,249.
Campbell, John D.: *See—*
Womble, William H.; and Campbell, John D., 4,015,801.
Campbell, Robert W., to Phillips Petroleum Company. Production of aromatic sulfide/sulfone polymers. 4,016,145, Cl. 260-79.30M.
Campi, Ambrogio: *See—*
Bellasio, Elvio; and Campi, Ambrogio, 4,016,162.
Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
Gray, Thomas J.; and Wojtowicz, Jan, 4,016,339.
Canadian General Electric Company Limited: *See—*
Eastcott, Peter deHertel, 4,016,496.
Cane, Mario. System for remotely checking equipment. 4,016,360, Cl. 179-2.00A.
Canon Kabushiki Kaisha: *See—*
Hirose, Ryusho, 4,015,895.
Inuzuka, Tsuneki; Furuichi, Katsushi; Sawamura, Osamu; Kimura, Yoshimasa; and Sakamaki, Hisashi, 4,016,529.
Matsumoto, Seiichi; and Hosoe, Kazuya, 4,016,471.
Uchiyama, Takashi; Mashimo, Yukio; and Nakamura, Zenzo, 4,016,575.
Capital Wire and Cable, Division of U.S. Industries: *See—*
Pringle, John Philip, 4,016,232.
Pringle, John Philip, 4,016,233.
Carberry, Richard Aladine, to Data General Corporation. Dynamic MOS memory with reduced propagation delay. 4,016,551, Cl. 340-173.00R.
Carl Schenck AG: *See—*
Giers, Alfred J., 4,015,480.
Carlow, Earl F.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,016,546.
Carlson, Elmer A., to International Telephone and Telegraph Corporation. Heating system. 4,015,928, Cl. 431-74.000.
Caron, Ronald N.; and Shapiro, Stanley, to Olin Corporation. Preparation of high strength copper base alloy. 4,016,010, Cl. 148-12.70C.
Carrieri, Louis F., to Gulf & Western Manufacturing Company. High response unloading valve. 4,015,620, Cl. 137-115.000.
Carroll, John P., to Living Walls Inc. Combined leveling bracket and shock absorber for cabinet. 4,015,808, Cl. 248-188.400.
Carter, Harris G., Jr.: *See—*
Kibler, Kenneth G.; and Carter, Harris G., Jr., 4,015,658.
Cashin Systems Corporation: *See—*
Spooner, Robert J.; and Dillon, Oscar W., 4,015,494.
Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Schnee, Karl; Tichy, Dieter; Michel, Walter; and Gruber, Gunter, 4,016,336.
Cassidy, Robert L.; Cosco, Robert J.; and Pappas, John A., to GTE Sylvania Incorporated. Deuterium arc lamp. 4,016,445, Cl. 313-185.000.
Castrol Limited: *See—*
Jayne, Gerald John Joseph; Askew, Herbert Frank; and Harrington, Colin John, 4,016,088.
Caterpillar Tractor Co.: *See—*
Barker, Noble G.; Corwin, John E.; Myers, Jimmy D.; and Yates, Jan B., 4,015,728.
Cole, Carroll Richard, 4,015,669.
Gee, James E.; and Stedman, Robert N., 4,015,348.
Herrick, George R., 4,016,398.
Cattermole, David Christopher, to Elliott Brothers (London) Limited. Tripod arrangements. 4,015,806, Cl. 248-168.000.
Causa, Alfredo Guillermo: *See—*
Alexander, William; Causa, Alfredo Guillermo; and Fraser, James Girvan, 4,016,142.
Cavazza, Claudio, to Sigma-Tau Industrie Farmaceutiche/Riunite S.p.A. Dispensing closure for a container. 4,015,758, Cl. 222-457.500.
Cavenar, Clarence William, to W & W Steel Company. Control apparatus for a length determining machine. 4,016,072, Cl. 209-74.00R.
Celanese Corporation: *See—*
Collins, George L.; and Costanza, John R., 4,016,334.
LaNieve, Herman L., 4,015,924.
Centre de Recherches Metallurgiques-Centrium voor Research in de Metallurgie: *See—*
Respen, Yves Jean; Cosse, Paul Andre; and Economopoulos, Mario, 4,016,015.
Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie: *See—*
Economopoulos, Mario; and Respen, Yves Jean, 4,016,009.
Certain-teed Products Corporation: *See—*
Heilmayr, Peter F., 4,015,925.
Cervical Traction Company, Inc. (Entire): *See—*
Beaver, Tony J., 4,015,597.
Chabert, Janine: *See—*
Boschetti, Eugene; Briet, Philippe; Berthelon, Jean-Jacques; and Chabert, Janine, 4,016,285.
Chagan, Alan M.: *See—*
Lancaster, Woodrow A.; Jebb, William T.; and Chagan, Alan M., 4,015,295.
Chalfant Sewing Fabricators, Inc.: *See—*
Chalfant, Thomas W., 4,015,380.
Chalfant, Thomas W., to Chalfant Sewing Fabricators, Inc. Truck loading dock seal. 4,015,380, Cl. 52-173.0DS.
Chamberlin, Donald W., to FMC Corporation. Can filling apparatus. 4,015,645, Cl. 141-34.000.
Champion International Corporation: *See—*
Norris, Alan H., 4,016,019.
Chan, Ka-Kong; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Synthesis of vitamin E. 4,016,178, Cl. 260-345.500.
Chang, Charles Hung, to GAF Corporation. Dyestuff process. 4,016,181, Cl. 260-380.000.
Chao, Tsai Hsiang, to American Cyanamid Company. Urea-glyoxal-formaldehyde cellulose reactant. 4,016,335, Cl. 428-526.000.
Chapelet, Gilbert: *See—*
Durand, Jean-Pierre; Aubin, Bernard; Dawans, Francois; and Chapelet, Gilbert, 4,015,952.
Chapman, Robert E., to Photo Systems, Inc. Center filling variable volume film drum. 4,016,585, Cl. 354-331.000.
Charles Churchill Limited: *See—*
Hodgson, Brian, 4,015,510.
Charles, Marvin: *See—*
Coughlin, Robert W.; and Charles, Marvin, 4,016,293.
Chatterjea, Probir K.: *See—*
Shore, Daniel B.; and Chatterjea, Probir K., 4,015,619.
Cheek, Robert L.: *See—*
Young, Walter L.; Douglas, C. J.; Connally, Carl A.; and Cheek, Robert L., 4,016,028.
Chemcut Corporation: *See—*
Goffredo, Daniel L.; and Shakley, Conrad Dale, 4,015,706.
Chemische Werke Huels Aktiengesellschaft: *See—*
Kupper, Friedrich-Wilhelm; and Streck, Roland, 4,016,220.
Chemische Werke Huls Aktiengesellschaft: *See—*
Sommer, Neithart; Cuntze, Gerhard; and Boehmer, Wolfgang, 4,016,347.
Wulf, Horst-Dieter; List, Ferdinand; Orlowski, Friedrich-August; Wilke, Norbert; and Pflegerl, Emmerich, 4,015,943.
Chemplex Company: *See—*
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Chen, David Wan-Ching: *See—*
Chen, Helen Ho-Chiu; and Chen, David Wan-Ching, 4,015,778.
Chen, Helen Ho-Chiu; and Chen, David Wan-Ching. Multifunctional folding chair. 4,015,778, Cl. 273-136.00G.
Chene, Jacques: *See—*
Galland, Jacques; Boutard nee Gabillet, Dominique; and Chene, Jacques, 4,015,950.
Cheney, Peter Arthur: *See—*
Burrows, Ian Edward; and Cheney, Peter Arthur, 4,016,295.
Chestel, Inc.: *See—*
Laoteppitaks, Chansak; Henthorn, Lincoln; and Falconer, Charles B., 4,016,370.
Cheung, Nelson, to Signode Corporation. Tensioning tool with self-energizing gripper plug. 4,015,643, Cl. 140-93.400.
Chevron Research Company: *See—*
Hess, Patrick H., 4,015,995.
Moore, Joseph E., 4,016,275.
Suzuki, Shigeto, 4,016,208.
Wilkes, John B., 4,016,185.
Cheyne, George Martin Frazer: *See—*
Bond, John Alan; Cheyne, George Martin Frazer; and Rayner, Adrien Patrick, 4,015,526.
Chilcoat, Bill R.: *See—*
Beatty, Ronald L.; Kiplinger, Dale V.; and Chilcoat, Bill R., 4,016,304.
Choksi, Pradip V.; and Steidley, Roy B., to American Hospital Supply Corporation. Method of opening medical liquid container with separable outer and inner closures. 4,015,400, Cl. 53-3.000.
Chong, Robert S. Y., to Merry Whirler Manufacturing Corporation. Cable dispenser. 4,015,795, Cl. 242-85.000.
Chosy, Eugene: *See—*
Hulverson, Adrian F.; and Chosy, Eugene, 4,015,876.
Chow, Philip Y., to Lin Offshore Engineering, Inc. Construction and launch barge and method of producing and installing offshore structures. 4,015,554, Cl. 114-65.00R.
Christena, Ray C., to Vulcan Materials Company. Separation and recovery of polychlorinated phenols. 4,016,047, Cl. 203-6.000.
Christensen, John L. Apparatus for coupling and uncoupling pipe sections. 4,015,661, Cl. 166-77.500.
Christian, Dorothy A. Safety canopy for crib. 4,015,297, Cl. 5-97.000.
Christiansen, Robert W., to Minnesota Mining and Manufacturing Company. Static eliminator. 4,016,455, Cl. 361-222.000.
Christie, Joe William. Split-sleeve pipe device with integral seal and insulator. 4,015,634, Cl. 138-99.000.
Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., to Gulf Research & Development Company. Multiple stage hydrodesulfurization process including partial feed oil by-pass of first stage. 4,016,069, Cl. 208-210.000.
Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., to Gulf Research & Development Company. Multiple stage hydrodesulfurization process with extended downstream catalyst life. 4,016,070, Cl. 208-210.000.
Chrysler United Kingdom Limited: *See—*
Button, John Charles Gladstone, 4,015,877.
Chu, Joseph Y. C.; and Gunther, W. H. H., to Xerox Corporation. Process for preparation of solid phase dispersion of photoconductive materials. 4,016,058, Cl. 204-158.00R.
Ciba-Geigy Corporation: *See—*
Bitzer, Diethelm; and Lohmann, Dieter, 4,016,013.
Darmory, Franklin P.; and DiBenedetto, Marianne, 4,016,173.
Jaeggi, Knut A.; Ostermayer, Franz; and Schroter, Herbert, 4,016,283.

Koller, Stefan; Lapple, Arnulf Ruediger; and Pacher, Marielise, 4,015,933.
Liechti, Hans Wilhelm; and Markert, Jurgen, 4,015,934.
Rempfler, Hermann; Bosshard, Hans; and Weber, Kurt, 4,016,203.
Robertson, George Heddle; and Stirling, John Andrew, 4,015,999.
Vuitel, Laurent; L'Eplattenier, Francois; and Pugin, Andre, 4,016,157.
Weber, Kurt; and Kormany, Geza, 4,016,156.

Cielo, John Robert; and Orfitelli, John Andrew, to International Business Machines Corporation. Pulse energy suppression network. 4,016,482, Cl. 323-17.000.

Cincinnati Milacron, Inc.: *See—*
Pfister, Stanley Arthur, 4,015,487.

Citation Companies, Inc., The: *See—*
DeBruyn, William T., 4,015,367.

Citizen Watch Co., Ltd.: *See—*
Morokawa, Shigeru; and Hashimoto, Yukio, 4,015,419.
Morokawa, Shigeru; and Sekiya, Fukuo, 4,016,476.

Clarebout, Pierre M.: *See—*
Vanhoof, Pierre M.; and Clarebout, Pierre M., 4,016,284.

Clark Door Company, Inc.: *See—*
Cook, Sanford L., 4,015,386.

Clark, George B., to Dow Chemical Company, The. Header block for tubular membrane permeator modules. 4,016,078, Cl. 210-94.000.

Clark, Leland L., to University of Utah, The. Wart treatment with phosphonoacetic acid or derivatives thereof. 4,016,264, Cl. 424-198.000.

Clark, Michael Nicholson, to United Kingdom of Great Britain and Northern Ireland, Secretary of State for Environment in Her Britannic Majesty's Government of the. Expansion joints. 4,015,302, Cl. 14-16.500.

Clark, Richard E.: *See—*
Miller, James G.; Clark, Richard E.; Conradi, Mark S.; Dietz, Dennis R.; and Heyman, Joseph S., 4,015,464.

Clary, Robert M.: *See—*
Small, Edward A.; Edwards, Richard H.; Eufusia, Eugene A.; Clary, Robert M.; and Bergfelt, Nils H., 4,015,558.

Claussen, Harvey L.: *See—*
Goheen, David W.; Fahey, Michael D.; and Claussen, Harvey L., 4,016,353.

Cleveland Marine Limited: *See—*
Burgess, John E., 4,015,497.

Clifton, Jack K.: *See—*
Anderson, Richard L.; Clifton, Jack K.; Masi, James V.; and Merrin, Seymour, 4,016,586.

Clipson, Stuart A.; and Lemkin, Jack L., to Midland-Ross Corporation. Stackable storage bin. 4,015,713, Cl. 206-509.000.

Cobb, James Dean: *See—*
Cooper, William H., Jr.; and Cobb, James Dean, 4,015,722.

Cochran, Chudleigh B., to Brown Oil Tools, Inc. Well tool which changes reciprocating movement to rotary motion. 4,015,662, Cl. 166-104.000.

Cocksedge, Kenneth W.: *See—*
Gabor, Andrew; and Cocksedge, Kenneth W., 4,016,470.

Cohen, Amnon Mordechai, to Polak's Frutal Works N.V. Alicyclic ketoester perfume compositions. 4,016,109, Cl. 252-522.000.

Cohen, Marshall J.: *See—*
Garito, Anthony Frank; Heeger, Alan J.; MacDiarmid, Alan G.; Bright, Arthur A.; Cohen, Marshall J.; and Mikulski, Chester M., 4,016,331.

Cohrs, William E.; Gunderman, Roland E.; and Crozier, William A., to Dow Chemical Company, The. Process for the preparation of expandable microspheres. 4,016,110, Cl. 260-2.50B.

Colbourne, Edwin Denis: *See—*
Gale, Geoffrey N.; Colbourne, Edwin Denis; and Hollins, Michael J., 4,016,449.

Colby, Bruce N.: *See—*
Hull, Charles W.; Whitehead, T. Wilson; and Colby, Bruce N., 4,016,421.

Cole, Carroll Richard, to Caterpillar Tractor Co. Circle mounting bar and circle assembly for a motor grader. 4,015,669, Cl. 172-796.000.

Colgate-Palmolive Company: *See—*
Knohl, Herbert, 4,015,448.
Win, Maung Hla; DiSalvo, Walter Anthony; and Kenney, Edward Joseph, 4,016,040.

Collaris, Maria Antonius Alphonsus Andreas; van Kemenade, Antonius Wilhelmus Cornelis; Debruijn, Henricus Antonius; and Snijders, Mathieu Willem Maria, to U.S. Philips Corporation. Method of selectively metallizing the display screen of a cathode-ray tube and cathode-ray tube manufactured by said method. 4,016,307, Cl. 427-54.000.

Collins, George L.; and Costanza, John R., to Celanese Corporation. Method of applying high adhesion ultraviolet curable coatings and coated articles. 4,016,334, Cl. 428-463.000.

Collis, Martin S.: *See—*
Hayward, John S.; Collis, Martin S.; Eckerson, John D.; and Rosenblood, Lorne K., 4,015,300.

Coloroll Limited: *See—*
Griffin, Gerald Joseph Louis, 4,016,117.

Colson, Andrew Elliott, Jr. In-ground swimming pool and apparatus and method for constructing same. 4,015,379, Cl. 52-169.100.

Colt Industries Operating Corporation: *See—*
Rietveld, Frank P., 4,016,395.

Colvin, Ronald L.; and Williams, James H., to United States of America, Air Force. Multiple level fluid bearing track assembly. 4,015,880, Cl. 302-31.000.

Comatel - Comptoir European de Materiel Electronique: *See—*
Cabaud, Aime, 4,015,322.

Combustion Engineering, Inc.: *See—*
Musick, Charles Ronald, 4,016,034.
Schuss, Jack A., 4,015,548.

Comey, David M.: *See—*
Baur, Robert F.; Comey, David M.; and Robillard, Gene A., 4,016,590.

Commissariat a l'Energie Atomique: *See—*
Gallet, Bernard; and Venot, Robert, 4,016,035.

Compagnie Generale d'Electricite: *See—*
Gamet, Brigitte; and Renard, Jean-Claude, 4,016,526.

Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
Rocton, Lucien, 4,015,894.

Compagnie Internationale pour l'Informatique: *See—*
Lazzari, Jean-Pierre, 4,016,601.

Compton, James B., to National Semiconductor Corporation. Field effect transistor switching circuit. 4,016,595, Cl. 357-43.000.

Concannon, Thomas P.: *See—*
Vassiliou, Eustathios; and Concannon, Thomas P., 4,016,125.

Conlon, Daniel R. Holding device for laboratory ware. 4,015,940, Cl. 23-259.000.

Connally, Carl A.: *See—*
Young, Walter L.; Douglas, C. J.; Connally, Carl A.; and Cheek, Robert L., 4,016,028.

Connolly, Edward A., to Fraser Sweatman, Inc. Analgesic apparatus. 4,015,617, Cl. 137-88.000.

Connor, David T.; Ringel, Samuel M.; and von Strandtmann, Maximilian, to Warner-Lambert Company. Amide derivatives of acids, an antibiotic produced by *Polyangium cellulosum* var. *fulvum*. 4,016,257, Cl. 424-122.000.

Conradi, Mark S.: *See—*
Miller, James G.; Clark, Richard E.; Conradi, Mark S.; Dietz, Dennis R.; and Heyman, Joseph S., 4,015,464.

Consolidation Coal Company: *See—*
Hawthorne, Arthur L.; and Hazen, David R., 4,015,674.

Continental Gummi-Werke Aktiengesellschaft: *See—*
Meckel, Werner; and Kilian, Werner, 4,015,320.

Continental Oil Company: *See—*
Alexander, Danrick W., 4,015,625.

Contreras, Boris L., to Pittman Products, Inc. Regulator first stage for underwater diving. 4,015,630, Cl. 137-505.250.

Cook, John: *See—*
Bagg, Greville Euan Gordon; Cook, John; Dingle, Leslie Ernest; Edwards, Henry; and Ziebland, Hans, 4,016,031.

Cook, Michael M.: *See—*
Persinski, Leonard J.; Cook, Michael M.; and Adams, Sally Lee, 4,015,991.

Cook, Sanford L., to Clark Door Company, Inc. Fire-retardant low temperature insulating building panel. 4,015,386, Cl. 52-232.000.

Cook, Thomas W.; Penner, Wayne A.; Quaglino, Carl A.; Ray, Charles D.; and Scott, Lyndell F., to Mobil Oil Corporation. System for recording seismic reflection signals in serial-by-trace format. 4,016,531, Cl. 340-15.5DP.

Cooke, William C.; and Agett, Albert H., to ASG Industries, Inc. Spandrel glass panel. 4,016,324, Cl. 428-248.000.

Cooper, William H., Jr.; and Cobb, James Dean, to McKenney's, Inc. Stacking machine and method. 4,015,722, Cl. 214-6.00D.

Cornell Research Foundation, Inc.: *See—*
Finn, Robert K.; Tannahill, Alex L.; and Laptewicz, Joseph E., Jr., 4,016,085.
Saxena, Brij B., 4,016,250.

Cornellier, Maurice H. Safety guard for rotary-type cutter. 4,015,408, Cl. 56-295.000.

Corwin, John E.: *See—*
Barker, Noble G.; Corwin, John E.; Myers, Jimmy D.; and Yates, Jan B., 4,015,728.

Cosco, Robert J.: *See—*
Cassidy, Robert L.; Cosco, Robert J.; and Pappas, John A., 4,016,445.

Cosse, Paul Andre: *See—*
Respen, Yves Jean; Cosse, Paul Andre; and Economopoulos, Mario, 4,016,015.

Costanza, John R.: *See—*
Collins, George L.; and Costanza, John R., 4,016,334.

Cotrel, Claude; Crisan, Cornel; Jeanmart, Claude; and Messer, Mayer Naoum, to Rhone-Poulenc S.A. Naphthyridine derivatives. 4,016,274, Cl. 424-250.000.

Coughlin, Robert W.; and Charles, Marvin. Method of carrying out enzyme catalyzed reactions. 4,016,293, Cl. 426-42.000.

Coupe, Neville Burton, to Denley-Tech Limited. Apparatus for delivering liquid and removing liquid from a container. 4,015,942, Cl. 23-259.000.

Court, Charles T.; and Miller, Jessie H., to Newcourt, Inc. Door or panel seal. 4,015,368, Cl. 49-488.000.

Cowans, Beatrice L.; and Hall, Virginia E., to Halico Inc. Embroidered fruit bowl wall hanging and kit for making same. 4,016,314, Cl. 428-35.000.

Cox, Randal A. Hay bale handling machine. 4,015,739, Cl. 214-766.000.

Craig, James T., Jr.; and Park, Arthur, to Standard Oil Company (Indiana). Directional drilling system. 4,015,673, Cl. 175-61.000.

Crawford, Chester C. Petroleum coke composition. 4,015,977, Cl. 75-3.000.

Crisan, Cornel: *See—*
Cotrel, Claude; Crisan, Cornel; Jeanmart, Claude; and Messer, Mayer Naoum, 4,016,274.

Crisp, Stephen; and Wilson, Alan Donald, to National Research Development Corporation. Cements comprising acrylic acid/itaconic acid copolymer and fluoroaluminosilicate glass powder. 4,016,124, Cl. 260-29.60M.

Crookston, Ronald W.: *See—*
LeRow, Charles E., Jr.; and Crookston, Ronald W., 4,016,384.

Crouthamel, Reading H. Solid state weld timer. 4,016,484, Cl. 323-22.0SC.

Crowley, Francis X. Concrete tank of precast concrete panels with pretensioning beam means. 4,015,383, Cl. 52-224.000.

Crown Zellerbach Corporation: *See—*
Goheen, David W.; Fahey, Michael D.; and Claussen, Harvey L., 4,016,353.

Crozier, William A.: *See—*
Cohrs, William E.; Gunderman, Roland E.; and Crozier, William A., 4,016,110.

Csillag, Charles, to Personal Products Company. Absorbent product with side leakage control means. 4,015,604, Cl. 128-287.000.

Culpepper, Clifford, Jr., to Aero-Dyne Manufacturing, Inc. Automatic high-low burner operation. 4,015,927, Cl. 431-5.000.

Cunningham, Hugh; Raetzsch, Carl W.; Rich, George L.; and Driskill, John D., to PPG Industries, Inc. Diaphragm cell cathode structure. 4,016,064, Cl. 204-256.000.

Cuntze, Gerhard: *See—*
Sommer, Neithart; Cuntze, Gerhard; and Boehmer, Wolfgang, 4,016,347.

Curtis, Gary Martin, to Illinois Tool Works Inc. Buckle with a visual tension indicator. 4,015,311, Cl. 24-23.00R.

Cutler, Charles W.: *See—*
Adams, James S.; and Cutler, Charles W., 4,016,489.

Daicel, Ltd.: *See—*
Sakaguchi, Yasuhiro; Koike, Junichi; and Kubo, Takehisa, 4,016,083.

Daimler-Benz Aktiengesellschaft: *See—*
Kunze, Lutz; Knapp, Kurt; and Brammer, Klaus, 4,015,338.

D'Alelio, Gaetano F. Halogenated esters of phosphorus-containing acids. 4,016,224, Cl. 260-952.000.

Damascus Steel Casting Company: *See—*
Moore, Harry M., Jr., 4,015,460.

Dan Wesson Arms, Inc.: *See—*
Brouthers, Paul E., 4,015,354.

D'Angelo, John: *See—*
Berkowitz, Sidney; and D'Angelo, John, 4,016,164.

Danko, John D.; and St. John, Richard C., to Aspro, Inc. Brake construction. 4,015,694, Cl. 188-106.00A.

Darmory, Franklin P.; and DiBenedetto, Marianne, to Ciba-Geigy Corporation. Oxindole diamines. 4,016,173, Cl. 260-325.00R.

Darvishian, Arthur. Higher efficiency wind motor with receptors of diminished drag characteristics. 4,015,911, Cl. 416-119.000.

Data General Corporation: *See—*
Carberry, Richard Aladine, 4,016,551.

Daicel Ltd.: *See—*
Kudo, Teizo; Hashizume, Yoshio; Itoh, Masanori; and Shiga, Makoto, 4,016,221.

Daus, Wolfgang, to Messer Griesheim GmbH. Process for cooling cryocables using a hydrogen slush. 4,015,437, Cl. 62-76.000.

Daver, Edul M., to Alcan Aluminum Corporation. Production of sintered aluminum alloy articles from particulate premixes. 4,015,947, Cl. 75-201.000.

Davies, Glyndwr John: *See—*
Baker, Dennis Stanley; and Davies, Glyndwr John, 4,015,949.

Davis, Elbert W. Work lifting and supporting device. 4,015,820, Cl. 254-4.00B.

Davison, Thomas W.: *See—*
Suzuki, Fred K.; and Davison, Thomas W., 4,015,591.

Dawans, Francois: *See—*
Durand, Jean-Pierre; Aubin, Bernard; Dawans, Francois; and Chapelet, Gilbert, 4,015,952.

DCA Food Industries Inc.: *See—*
Roth, Howard; Baldry, Peter R.; Kaufman, Harold B., Jr.; McCarthy, John P.; and Wallenfels, Kurt, 4,015,518.

De La Moneda, Francisco H., to International Business Machines Corporation. Raised source and drain IGFET device and method. 4,016,587, Cl. 357-23.000.

Deak, Paul S.: *See—*
Voyles, Gerald A.; and Deak, Paul S., 4,016,464.

Deal, Samuel Broughton; and Bartch, Donald Walter, to RCA Corporation. Method for adhering components platform to cathode-ray tube and product thereof. 4,016,363, Cl. 358-248.000.

Dean, Robert, to Spiral-Craft. Step bracket. 4,015,687, Cl. 182-220.000.

DeAngelo, Gerald J.: *See—*
Gelzheiser, Francis L.; and DeAngelo, Gerald J., 4,016,386.

Debruijn, Henricus Antonius: *See—*
Collaris, Maria Antonius Alphonsus Andreas; van Kemenade, Antonius Wilhelmus Cornelis; Debruijn, Henricus Antonius; and Snijders, Mathieu Willem Maria, 4,016,307.

DeBruyn, William T., to Citation Companies, Inc., The. Window sash positioner. 4,015,367, Cl. 49-451.000.

Deeg, Emil W.; and Krohn, David A., to American Optical Corporation. Method of making artificial intraocular lenses with holes. 4,015,965, Cl. 65-23.000.

DeFilippi, Robert Joseph, to International Business Machines Corporation. Load gate compensator circuit. 4,016,434, Cl. 307-297.000.

De Haeck, Robert, to La Soudure Electrique Autogene, Procedes Arcos. Flux-cored wire for electric arc welding of soft steels or low-alloyed steels. 4,016,399, Cl. 219-146.000.

Dehnert, Heinz, to Hugo Sachs Elektronik Kommanditgesellschaft. Apparatus for detecting and indicating electrical body potentials. 4,015,596, Cl. 128-2.06R.

Dehnert, Johannes; and Lamm, Gunther, to BASF Aktiengesellschaft. Azo dye with a 2,6-diamino-5-cyano-or-5-carbamoyl-pyridine coupling component. 4,016,152, Cl. 260-156.000.

Deitz, Victor R.; and Blachly, Charles H., to United States of America, Energy Research and Development Administration. Salts of the iodine oxyacids in the impregnation of adsorbent charcoal for trapping radioactive methyliodide. 4,016,242, Cl. 423-240.000.

Dekanat Prirodovedecke Fakulty University Karlovy: *See—*
Rieder, Milan, 4,016,420.

Deknatel Inc.: *See—*
Kurtz, Leonard D.; and Bidwell, Robert E., 4,015,603.

Delaage, Jacques Jean, to Societe d'Etudes et de Construction de Materiel Electronique S.E.C.M.E. Switching device, in particular for a printed circuit. 4,016,401, Cl. 200-277.000.

Delagi, Bruce A.; Zeh, Joseph Paul; and Elia-Shaoul, Rony, to Digital Equipment Corporation. Memory unit for connection to central processor unit and interconnecting bus. 4,016,541, Cl. 340-172.500.

Delalande S.A.: *See—*
Turin, Michel J.; Raynaud, Guy M.; Pourrias, Bernard M.; and Guerret, Patrick G., 4,016,154.

Delle-Alsthom: *See—*
Nicoloso, Dante, 4,016,383.

Dellinger, Eugene L.; and Loubier, Robert J. Orthodontic band forming method and apparatus. 4,015,333, Cl. 32-14.00A.

Delta Scientific Corporation: *See—*
Kushner, Jack; and Zwirblis, Henry G., 4,015,914.

Demarthe, Jean-Michel; Georgeaux, Andre; and Sonntag, Alain, to Societe Miniere et Metallurgique de Penarroya. Method of obtaining copper from sulphurized concentrates. 4,016,056, Cl. 204-108.000.

Demarthe, Jean-Michel: *See—*
Gandon, Louis; and Demarthe, Jean-Michel, 4,016,054.

De Mets, Albert, to Konstruktiewerkhuizen, DeMets N.V. Continuously operating preliminary press or finishing press for the manufacture of particle boards, such as chip boards, fiber boards and the like. 4,015,921, Cl. 425-371.000.

Denley-Tech Limited: *See—*
Coupe, Neville Burton, 4,015,942.

DePalma, James J.: *See—*
Dillon, Peter L. P.; and DePalma, James J., 4,016,597.

Derby, Sherwin L.: *See—*
Wirth, George H.; and Derby, Sherwin L., 4,015,579.

De Remigis, Joseph, to Sentrol Systems Ltd. Optical shoe assembly for use with a multi-sensor optical head. 4,015,904, Cl. 356-243.000.

DeSantis, Stanislao A., to Appleman, Milo Don, a part interest. Animal feed block. 4,016,296, Cl. 426-69.000.

DeSoto, Inc.: *See—*
Gaske, Joseph E.; and Georgas, Nick T., 4,016,333.

Dezawa, Shin-ichiro; and Tamai, Yasuo, to Fuji Photo Film Co., Ltd. Process of producing ferromagnetic materials. 4,016,057, Cl. 204-130.000.

DiBenedetto, Marianne: *See—*
Darmory, Franklin P.; and DiBenedetto, Marianne, 4,016,173.

Dick, John O., to United States of America, Navy. Two channel optical fuzing system. 4,015,530, Cl. 102-70.20P.

Diebold, Incorporated: *See—*
Graef, Harry T.; Hansen, Kenneth R.; and Morrison, Larry A., 4,015,537.
McCune, Harold K.; and Kronewitter, Michael R., 4,016,405.

DIEHL: *See—*
Gerum, Erich, 4,016,562.

Diesel Kiki Co., Ltd.: *See—*
Okura, Rikuo; and Suzuki, Yasuhide, 4,015,573.

Dietmann, Karl: *See—*
Fauland, Erich; Kampe, Wolfgang; Stach, Kurt, deceased; Plattner, Werner, executor; Stork, Harald; and Dietmann, Karl, 4,016,262.

Dietrick, Gerald P. Device for removing water from hydraulic fluid. 4,015,369, Cl. 51-2.00R.

Dietz, Dennis R.: *See—*
Miller, James G.; Clark, Richard E.; Conradi, Mark S.; Dietz, Dennis R.; and Heyman, Joseph S., 4,015,464.

Dietze, Wolfgang; Reuschel, Ronrad; and Kasper, Andreas, to Siemens Aktiengesellschaft. Apparatus for the manufacture of tubular bodies of semiconductor material. 4,015,922, Cl. 425-471.000.

Difflipp, Kurt: *See—*
Preuss, Friedrich; and Difflipp, Kurt, 4,015,522.

DiGioia, Frank A.; and Brown, Timothy W., to General Latex and Chemical Corporation. Automotive carpet mat and method of preparing same. 4,016,318, Cl. 428-95.000.

Digital Equipment Corporation: *See—*
Delagi, Bruce A.; Zeh, Joseph Paul; and Elia-Shaoul, Rony, 4,016,541.

Dillinger, Lester L. Drilling or reaming machine. 4,015,304, Cl. 15-104.10R.

Dillon, Oscar W.: *See—*
Spooner, Robert J.; and Dillon, Oscar W., 4,015,494.

Dillon, Peter L. P.; and DePalma, James J., to Eastman Kodak Company. Color video camera with selectively expanded sensitivity. 4,016,597, Cl. 358-41.000.

DiMatteo, Paul L., to Dynell Electronics Corporation. Method of transferring a person from a reclined position to a seated position. 4,016,005, Cl. 134-30.000.

Dingle, Leslie Ernest: *See—*
Bagg, Greville Euan Gordon; Cook, John; Dingle, Leslie Ernest; Edwards, Henry; and Ziebland, Hans, 4,016,031.

Dinlocker, Robert I., to Sheller-Globe Corporation. Tilt alarm for tractor vehicle or the like. 4,016,535, Cl. 340-52.00H.

DiSalvo, Walter Anthony: *See—*
Win, Maung Hla; DiSalvo, Walter Anthony; and Kenney, Edward Joseph, 4,016,040.

Disselnkotter, Hans: *See—*
Konig, Hans-Bodo; Schrock, Wilfried; Disselnkotter, Hans; and Metzer, Karl Georg, 4,016,282.

Ditzel, Heins; and Ditzel, Werner. Indexing devices. 4,015,513, Cl. 90-57.000.

Ditzel, Werner: *See—*
Ditzel, Heins; and Ditzel, Werner, 4,015,513.

Dixie Yarns, Inc.: *See—*
Hurst, William Dan; Huffman, Donald E.; King, Hermon A.; and Puckett, Jack, 4,015,314.

Dob, Allan Matthew: *See—*
Herr, John Addison; Jaffe, Wolfgang; Dob, Allan Matthew; Minalga, Philip Francis; Adams, Kenneth Douglas; and Herron, William Lee, 4,016,441.

Dobler, Karl Ulrich; Jakob, Wolfgang; Eltzschig, Klaus; and Ubel, Helmut, to International Standard Electric Corporation. System for the demand-dependent control of guided vehicles. 4,015,804, Cl. 246-5.000.

Dr. Hesse & Cie. Spezialfabrik fur Galvanotechnik: *See—*
Jung, Horst; Sassenroth, Karl-Wilhelm; and Ferenczy, Nikolaus, 4,015,992.

Dr. Ing. h.c.f. Porsche Aktiengesellschaft, Firma: *See—*
Eyb, Wolfgang; Soffge, Friedhelm; Piper, Ortwin; and Albrecht, Gerhard, 4,015,303.

Domain Industries, Inc.: *See—*
Grevich, John J., 4,016,026.

Domnitz, David K.; and Osborne, Billy R., to W. R. Grace & Co. Apparatus and method for loading block-like articles into a receptacle. 4,015,402, Cl. 53-29.000.

Dorling, Rolf: *See—*
Albrecht, Wolfgang; and Dorling, Rolf, 4,015,742.

Douglas, C. J.: *See—*
Young, Walter L.; Douglas, C. J.; Connally, Carl A.; and Cheek, Robert L., 4,016,028.

Douglas, George Henry; and Santora, Norman J., to William H. Rorer, Inc. Preparation of ethynylbenzenes. 4,016,214, Cl. 260-649.00F.

Dow Chemical Company, The: *See—*
Clark, George B., 4,016,078.
Cohrs, William E.; Gunderman, Roland E.; and Crozier, William A., 4,016,110.
Johnsen, Kenneth E., 4,015,317.
Kroposki, Lorraine M.; and Yoshimine, Masao, 4,016,225.
Thill, Bruce P.; and Paige, Janet N., 4,016,171.
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Dow, Norris F.: *See—*
Halton, Murray; Dow, Norris F.; Dow, Richard M.; and Hillebrand, Michael J., 4,015,637.

Dow, Richard M.: *See—*
Halton, Murray; Dow, Norris F.; Dow, Richard M.; and Hillebrand, Michael J., 4,015,637.

Dowbenko, Rostyslaw: *See—*
Anderson, Carl Clement; and Dowbenko, Rostyslaw, 4,016,332.

Dowke, Gosaburo: *See—*
Inoue, Tadahiko; Dowke, Gosaburo; and Itoh, Hideo, 4,016,265.

Draper, Charles W.; and Legatti, Raymond H., to Square D Company. Electrical device with retractable grounding pin and indicating means. 4,015,888, Cl. 339-14.00P.

Dravo Corporation: *See—*
Jordan, Joseph L., 4,016,073.
Selmeczi, Joseph G.; Marlin, Donald H.; and Kestner, Daniel W., 4,015,997.

Dreissigacker, Peter D.; and Dreissigacker, Richard A. Backpack frame having shoulder and hip supports with flexible connection to hip support. 4,015,759, Cl. 224-25.00A.

Dreissigacker, Richard A.: *See—*
Dreissigacker, Peter D.; and Dreissigacker, Richard A., 4,015,759.

Drews, Ulrich; Winkelmann, Lothar; and Werner, Peter, to Robert Bosch G.m.b.H. Stabilized fuel injection system. 4,015,563, Cl. 123-32.0EH.

Driskill, John D.: *See—*
Cunningham, Hugh; Raetzsch, Carl W.; Rich, George L.; and Driskill, John D., 4,016,064.

DSO "Bulgarski Darjavni Jeleznitzi": *See—*
Stanev, Tzvyatko Penchev, 4,015,675.

Duke, Edward D.: *See—*
Shore, Daniel B.; and Duke, Edward D., 4,015,681.

Duke, Susan Ann: *See—*
Forward, Geoffrey Charles; and Duke, Susan Ann, 4,016,255.

Dumbaugh, George D., to Vibranetics, Inc. Adjustable drive vibratory device. 4,015,705, Cl. 198-770.000.

Duncan, Michael T.: *See—*
Sawyer, Willard H.; and Duncan, Michael T., 4,016,106.

Dundua, Vakhtang Justinovich: *See—*
Ambardanishvili, Tristan Silovanovich; Dundua, Vakhtang Justinovich; and Kolomiitsev, Mikhail Alexandrovich, 4,016,095.

Dunne, Samuel B., to Fosco Fabricators, Inc. Changeable message highway sign machine. 4,015,349, Cl. 40-33.000.

Du Pont de Nemours, E. I., and Company: *See—*
Apple, Glenn Dwight, 4,015,479.
Gajjar, Bharat Jaybhadra, 4,015,451.
Holmes, David Alan, 4,016,345.
Hull, Charles W.; Whitehead, T. Wilson; and Colby, Bruce N., 4,016,421.
Jaffe, Edward Ephraim, 4,015,998.
McIntyre, William Ernest, Jr., 4,016,321.
McKenna, James Michael, 4,016,349.
Patterson, Frank Knowles, 4,016,447.
Rohde, Vernon Carl, 4,015,775.
Vassiliou, Eustathios; and Concannon, Thomas P., 4,016,125.

Durand, Jean-Pierre; Aubin, Bernard; Dawans, Francois; and Chapelet, Gilbert, to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Liquid hydrocarbon compositions of improved behavior in the cold and containing diene polymers. 4,015,952, Cl. 44-80.000.

Durant, Dick Q.: *See—*
McKinney, Howard F.; Higginbotham, Nathan L.; and Durant, Dick Q., 4,015,341.

Durney, David John, to Burroughs Corporation. Solid state chip insertion apparatus. 4,015,764, Cl. 227-118.000.

Dursch, Walter, to Hoechst Aktiengesellschaft. Unsaturated phosphorus compounds. 4,016,222, Cl. 260-932.000.

Duskin Franchise Co., Ltd.: *See—*
Komatsu, Toshiyoshi, 4,015,305.

Dynamit Nobel Aktiengesellschaft: *See—*
Kotzsch, Hans-Joachim; and Vahlensieck, Hans-Joachim, 4,016,188.

Dynatech Corporation: *See—*
Mitchiner, Robert K.; and Russell, Wayne A., 4,015,606.

Dynell Electronics Corporation: *See—*
DiMatteo, Paul L., 4,016,005.

E. C. Chemical Industries & Co., Ltd.: *See—*
Hamada, Kenzo; and Uchiyama, Hiroshi, 4,016,118.

E. J. Brooks Company: *See—*
Moberg, Sigurd M., 4,015,456.

Eastcott, Peter deHertel, to Canadian General Electric Company Limited. Method and apparatus for producing ramp signals with rounded inflection points. 4,016,496, Cl. 328-35.000.

Eastman Kodak Company: *See—*
Dillon, Peter L. P.; and DePalma, James J., 4,016,597.
Kirn, Thomas G., 4,016,600.

Eaton, James W., to Masonite Corporation. Building wall panel system. 4,015,392, Cl. 52-533.000.

Ebauches S.A.: *See—*
Rochat, Daniel-Francois, 4,015,418.

Eberhardt, Hans; and Brickl, Rolf Stefan, to Boehringer Ingelheim GmbH. Dermatological compositions containing an acylamino-carboxylic acid or an alkyl ester thereof. 4,016,287, Cl. 424-309.000.

ECC Corporation: *See—*
Mason, William B., 4,016,474.

Eckerson, John D.: *See—*
Hayward, John S.; Collis, Martin S.; Eckerson, John D.; and Rosenblood, Lorne K., 4,015,300.

Economopoulos, Mario; and Respen, Yves Jean, to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie. Producing rolled steel products. 4,016,009, Cl. 148-12.00B.

Economopoulos, Mario: *See—*
Respen, Yves Jean; Cosse, Paul Andre; and Economopoulos, Mario, 4,016,015.

Edwards, Henry: *See—*
Bagg, Greville Euan Gordon; Cook, John; Dingle, Leslie Ernest; Edwards, Henry; and Ziebland, Hans, 4,016,031.

Edwards, Richard H.: *See—*
Small, Edward A.; Edwards, Richard H.; Eufusia, Eugene A.; Clary, Robert M.; and Bergfelt, Nils H., 4,015,558.

Egelhof, Dieter: *See—*
Schiel, Christian; Egelhof, Dieter; and Wolf, Karl, 4,016,033.

Eggemann, Willi; and Weghaupt, Erich, to Kraftwerk Union Aktiengesellschaft. Liquid-cooled rotor of electric machines and method of production. 4,016,442, Cl. 310-59.000.

Eggermont, Ludwig Desire Johan, to U.S. Philips Corporation. Signal processor with digital filter and integrating network. 4,016,410, Cl. 235-156.000.

Eguchi, Chikahiko: *See—*
Mitsugi, Koji; Sano, Konosuke; Yokozeki, Kenzo; Yamada, Kazuhiko; Noda, Ichiro; Kagawa, Teruhiko; Eguchi, Chikahiko; Yasuda, Naohiko; Tamura, Fumihide; and Togo, Kazushi, 4,016,037.

Eguchi, Yoshitsugu: *See—*
Ogawa, Kinya; Kurimoto, Kazuhiko; Eguchi, Yoshitsugu; and Kuwata, Satoshi, 4,016,341.

Eisenhut, Bert R.: *See—*
Silver, Robert L.; and Eisenhut, Bert R., 4,015,714.

El Chico Corporation: *See—*
Pomara, Johnny B., Jr., 4,015,517.

Elastomeric Products Inc.: *See—*
Pennell, Paul H., 4,015,851.

Electricite de France (Service National): *See—*
Gillet, Roger, 4,016,444.

Eletsky, Vladimir Alexeevich: *See—*
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.

Elia-Shaoul, Rony: *See—*
Delagi, Bruce A.; Zeh, Joseph Paul; and Elia-Shaoul, Rony, 4,016,541.

Elings, Virgil B.; and Phillips, David T. Apparatus and method for measuring cardiac output. 4,015,593, Cl. 128-2.05V.

Ellerbrock, Donald H.; and Hough, Robert J., to Boise Cascade Corporation. Method for protecting metal ends. 4,016,311, Cl. 427-287.000.

Elliott Brothers (London) Limited: *See—*
Cattermole, David Christopher, 4,015,806.

Elmer, Otto C., to General Tire & Rubber Company, The. Lignin sulfonate for glass cord adhesives. 4,016,119, Cl. 260-17.500.

Elsbett, Gunter: *See—*
Elsbett, Ludwig; and Elsbett, Gunter, 4,015,577.

Elsbett, Ludwig; and Elsbett, Gunter. Reciprocable piston internal combustion engine, especially diesel engine. 4,015,577, Cl. 123-188.00M.

Eltzschig, Klaus: *See—*
Dobler, Karl Ulrich; Jakob, Wolfgang; Eltzschig, Klaus; and Ubel, Helmut, 4,015,804.

Emco Wheaton Inc.: *See—*
Bower, Allen M., 4,015,627.

Enderby, Ralph Thomas: *See—*
Hodges, Eugene Walton, III; Steel, Francis Robert; and Enderby, Ralph Thomas, 4,016,510.

Engel, Joseph C., to Westinghouse Electric Corporation. High pressure discharge lamp dimming circuit utilizing variable duty-cycle photocoupler. 4,016,451, Cl. 315-158.000.

Engel, Walter; Senn, Werner; and Steinemann, Max, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Explosive projectile with projectile body. 4,015,534, Cl. 102-87.000.

Engelhard Minerals & Chemicals Corporation: *See—*
Thakur, Babu N., 4,015,931.

Engineered Metal Products Company, Inc.: *See—*
Wunsche, Edgar, 4,015,834.

English, Alan Frederick: *See—*
Phillipps, Gordon Hanley; English, Alan Frederick; and Stribley, Gillian Helen, 4,016,271.

Enor Nominees Pty. Limited: *See—*
Schmidt, Hans Heinrich, 4,016,228.

Enterprise Brass Works: *See—*
Nelson, Lowell F., 4,015,647.

Epstein, George; and Mollman, Robert E., to Alside, Inc. Angled cap member for simulated cedar shake construction. 4,015,374, Cl. 52-57.000.

Epstein, George; and Mollman, Robert E., to Alside, Inc. Simulated cedar shake construction. 4,015,391, Cl. 52-520.000.

Erickson, Earl R. Portable device for lifting and moving an object. 4,015,736, Cl. 214-390.000.

Erickson, Ross R.: *See—*
Pharriss, Bruce B.; Erickson, Ross R.; and Tillson, Stephen A., 4,016,270.

Ericson, Alvin E., to Union Carbide Corporation. Apparatus for making reinforced wicket hole directionally tear prone. 4,015,917, Cl. 425-290.000.

Erlich, Shlomo. Cigarette box or package. 4,015,769, Cl. 229-44.0CB.

Esab-Hebe AB: *See—*
Bergling, Charles Gunnar Birger, 4,015,702.

Eschinasi, Emile H. Pectic substances with varying methoxyl content and process therefor. 4,016,351, Cl. 536-2.000.

Essers, Wilhelmus Gerardus; and Tichelaar, Gerrit Willem, to U.S. Philips Corporation. Method of and apparatus for arc welding. 4,016,397, Cl. 219-121.00P.

Essiccatoi Fava S.p.A.: *See—*
Fava, Enrico, 4,015,378.

Etablissements Carpano & Pons: *See—*
Thenon, Christian; and Pelletier, Bernard, 4,015,792.

Etat Francais: *See—*
Lenotre, Michel Pierre Alphonse, 4,016,018.

Eufusia, Eugene A.: *See—*
Small, Edward A.; Edwards, Richard H.; Eufusia, Eugene A.; Clary, Robert M.; and Bergfelt, Nils H., 4,015,558.

Evans, Clifford A.: *See—*
Kamin, Arthur; Evans, Clifford A.; and Freborg, Lehner C., 4,015,481.

Evans, Frank G.: *See—*
Mesecar, Roderick S.; and Evans, Frank G., 4,016,407.

Evans, Harold O., to United States of America, Air Force. Caseless ammunition round with spin stabilized metal flechette and disintegrating sabot. 4,015,527, Cl. 102-38.000.

Evans, Peter John; and Williams, Clive, to International Business Machines Corporation. Raster display apparatus. 4,016,554, Cl. 340-324.0AD.

Evans, Robert H.; and Wochinski, Ronald F., to AES Technology Systems, Inc. Method and apparatus for feeding and printing documents. 4,015,523, Cl. 101-233.000.

Everhart, Norman, to Jerrold Electronics Corporation. Radio frequency distribution network standby power system with overvoltage protection. 4,016,458, Cl. 361-52.000.

Ewarts Limited: *See—*
Hayes, Stephen, 4,015,631.

Exxon Research and Engineering Company: *See—*
Robson, Harry E., 4,016,108.
Sawyer, Willard H.; and Duncan, Michael T., 4,016,106.
Sawyer, Willard H.; and Robson, Harry E., 4,016,107.
Wagensommer, Joseph, 4,016,342.

Eyb, Wolfgang; Soffge, Friedhelm; Piper, Ortwin; and Albrecht, Gerhard, to Dr. Ing. h.c.f. Porsche Aktiengesellschaft, Firma. Support element for a bridge. 4,015,303, Cl. 14-75.000.

Ezhova, Vera Vasilievna: *See—*
Akbaev, Abdi; and Ezhova, Vera Vasilievna, 4,016,272.

Fa. H. Krantz: *See—*
Kreitz, Hans, 4,015,452.

Fahey, Michael D.: *See—*
Goheen, David W.; Fahey, Michael D.; and Claussen, Harvey L., 4,016,353.

Fahlvik, Nils Arne: *See—*
Andersson, Bror Lennarth; and Fahlvik, Nils Arne, 4,015,935.

Fairchild Industries Inc.: *See—*
Maieli, Joseph R.; Rosenthal, Gordon; and Torrillo, Domenick T., 4,015,787.

Falconer, Charles B.: *See—*
Laoteppitaks, Chansak; Henthorn, Lincoln; and Falconer, Charles B., 4,016,370.

Falk, David O.: *See—*
Norton, Charles J.; and Falk, David O., 4,016,086.

Farber, Sheldon, to NCR Corporation. Benzoindole phthalides. 4,016,174, Cl. 260-326.14R.

Farquhar, Robert L.; and Snook, Phillip D., to Graviner Limited. Methods and apparatus for optimizing the response of transducers. 4,016,425, Cl. 250-372.000.

Farrington, Daniel O.: *See—*
Switzer, William P.; and Farrington, Daniel O., 4,016,253.

Fastner, Thorwald; Mayrhofer, Max; and Bachner, Ernst, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Process and apparatus for continuously casting strands of unkilled or semi-killed steel. 4,015,655, Cl. 164-66.000.

Fatemi, Mohammad: *See—*
Birks, Laverne S.; and Fatemi, Mohammad, 4,016,456.

Fattor, Arthur. Solar heating apparatus. 4,015,585, Cl. 126-271.000.

Fattori, Silvano; Rossi, Enzo; and Imparato, Luigi, to Snam Progetti S.p.A. Stabilized polyglycol for high temperatures. 4,016,211, Cl. 260-611.500.

Fauland, Erich; Kampe, Wolfgang; Stach, Kurt, deceased; by Plattner, Werner, executor; Stork, Harald; and Dietmann, Karl, to Boehringer Mannheim G.m.b.H. Therapeutic compositions and methods employing N(6)-disubstituted adenosine compounds. 4,016,262, Cl. 424-180.000.

Fava, Enrico, to Essiccatoi Fava S.p.A. Device for clamping flat panels against metal section uprights, particularly for lining drying chambers. 4,015,378, Cl. 52-127.000.

Feerick, Jay J. Gas-operated firearm. 4,015,512, Cl. 89-190.000.

Fenestra: *See—*
Noyes, Harry M., 4,015,382.

Fenske, John W.: *See—*
Simons, John R.; and Fenske, John W., 4,015,665.

Fenster, Larry A. Applicator pads. 4,015,306, Cl. 15-209.00R.

Fenton, Donald M., to Union Oil Company of California. Recarbonation of spent oil shale. 4,016,239, Cl. 423-155.000.

Ferenczy, Nikolaus: *See—*
Jung, Horst; Sassenroth, Karl-Wilhelm; and Ferenczy, Nikolaus, 4,015,992.

Ferriter, Roger G., to Wix Corporation. Container. 4,015,767, Cl. 229-16.00R.

Ferro, William P., to KCS Industries, Inc. Method of making simulated stained glass from moldable plastic material. 4,016,235, Cl. 264-132.000.

Fielding, Harold Crosbie; and Rudge, Alfred John, to Imperial Chemical Industries Limited. Preparation of perfluoroolefines. 4,016,217, Cl. 260-653.10R.

Fields, David E.: *See—*
Moran, Paul Richard; Podgorsak, Ervin B.; and Fields, David E., 4,016,422.

Filisky, John J., Jr.: *See—*
Sousamian, William; and Filisky, John J., Jr., 4,015,698.

Fimacon Associates: *See—*
Betensky, Ellis I., 4,015,902.

Finch, Peter Molyneux, to British Leyland UK Limited. Steering wheels. 4,015,861, Cl. 280-750.000.

Finelli, Patrick L., to Polaroid Corporation. Folding viewfinding and flash mounting assembly. 4,016,580, Cl. 354-126.000.

Finn, Robert K.; Tannahill, Alex L.; and Laptewicz, Joseph E., Jr., to Cornell Research Foundation, Inc. Production of heteropolysaccharide by fermentation of methanol. 4,016,085, Cl. 252-8.50C.

Firestone Tire & Rubber Company, The: *See—*
Higbee, Wallace Carson, 4,015,796.

First-Sha Co., Ltd.: *See—*
Itoh, Hirokazu, 4,016,309.

Fischer & Porter Co.: *See—*
Herzl, Peter J., 4,015,472.
Sitkewich, W. Jorge, 4,015,477.

Fischer, Ronald H.; and Milstein, Donald, to Mobil Oil Corporation. Process for demetalation and desulfurization of petroleum oils. 4,016,067, Cl. 208-89.000.

Fishburn, Robert Anthony; and Ravault, Frank Ernest George, to Foseco International Limited. Bonding of particulate materials. 4,015,979, Cl. 75-25.000.

Fitzner, Arthur O., to Brunswick Corporation. Ignition system for internal-combustion engines having timing stabilizing means. 4,015,564, Cl. 123-117.00R.

Flachbarth, Charles T.; and Myers, John L., to Textron, Inc. Service poles and accessories. 4,015,397, Cl. 52-713.000.

Flambeau Paper Company: *See—*
Baierl, Kenneth W., 4,016,180.

Flautt, Martin C.; Foley, Kevin M.; and Haines, Richard M., to Owens-Corning Fiberglas Corporation. Glass fiber reinforced elastomers. 4,016,325, Cl. 428-268.000.

FMC Corporation: *See—*
Bacon, Roger J., 4,015,407.
Berkowitz, Sidney; and D'Angelo, John, 4,016,164.
Chamberlin, Donald W., 4,015,645.

Foley, Kevin M.: *See—*
Flautt, Martin C.; Foley, Kevin M.; and Haines, Richard M., 4,016,325.

Folsom, Lawrence R.; O'Brien, John F.; Gaboriault, Roger E.; Haberstroh, August J.; and Mancuso, Ettore J., Jr., to General Electric Company. Feeder. 4,015,511, Cl. 89-33.0SF.

Food Technology Products: *See—*
Glabe, Elmer F.; Anderson, Perry W.; and Laftsidis, Stergios, 4,016,294.

Forbes Jones, Robin Mackay; and Petersen, Walter Adrian, to International Nickel Company, Inc., The. Clad metal tubes. 4,016,008, Cl. 138-140.000.

Forenade Fabriksverken: *See—*
Tisell, Claes-Gustav Erik Yngve; Lundell, Karl Erik Bjorn; Horner, Sven Henry Nilsson; Thorstensson, Gustav Yngve; and Karlstedt, Gustav Sven Erik, 4,015,860.

Formation, Inc.: *See—*
Franks, Theodore A.; and Kapeghian, Charles L., 4,016,543.

Forster, Hermann; Schluter, Wilhelm; and Sterr, Horst, to Lodige, Wilhelm; Lodige, Fritz; and Lucke, Josef. Apparatus for applying glue to fiber material. 4,015,829, Cl. 259-9.000.

Fort Howard Paper Company: *See—*
Sobota, John T., 4,016,030.

Forward, Geoffrey Charles; and Duke, Susan Ann, to Beecham Group Limited. Oral hygiene compositions. 4,016,255, Cl. 424-52.000.

Fosco Fabricators, Inc.: *See—*
Dunne, Samuel B., 4,015,349.

Foseco International Limited: *See—*
Fishburn, Robert Anthony; and Ravault, Frank Ernest George, 4,015,979.

Foster Wheeler Energy Corporation: *See—*
Yousoufian, Hrant Harry, 4,015,562.

Fowler, Robert W., to United States of America, Navy. Fractional binary to decimal converter. 4,016,560, Cl. 340-347.0DD.

Fowles, Edwin, to Hilti Aktiengesellschaft. Formation of lugs on ingot moulds. 4,015,814, Cl. 249-174.000.

Fox, Albert H., to Fox, Bryce J.; and Fox, Edna R., part interest to each. Intake system with focusing means. 4,015,575, Cl. 123-141.000.

Fox, Bryce J.: *See—*
Fox, Albert H., 4,015,575.

Fox, Edna R.: *See—*
Fox, Albert H., 4,015,575.

Fozzard, George B.; and Paul, Robert A., to Phillips Petroleum Company. Separation of phenol-cyclohexanone azeotrope by extractive distillation with adipic acid diester. 4,016,049, Cl. 203-60.000.

Frahm, Carl E.; and Frahm, Shirley E. Valve construction. 4,015,632, Cl. 137-801.000.

Frahm, Carl E.; and Frahm, Shirley E. Collapsible carrying case. 4,015,741, Cl. 220-6.000.

Frahm, Shirley E.: *See—*
Frahm, Carl E.; and Frahm, Shirley E., 4,015,632.
Frahm, Carl E.; and Frahm, Shirley E., 4,015,741.

Frait, John S., to Kelsey-Hayes Company. Failsafe system for skid control systems and the like. 4,016,457, Cl. 361-49.000.

Francis, Gaylord L.; and Morelli, Amedeo J., to North American Philips Corporation. Hermetically sealed film resistor. 4,016,527, Cl. 338-274.000.

Frankel, S. Arthur; McGuire, George E.; and Wuthrich, Robert O., to Zimmer, U.S.A. Inc. Device for mixing bone cement. 4,015,945, Cl. 23-292.000.

Franks, Theodore A.; and Kapeghian, Charles L., to Formation, Inc. Processor address recall system. 4,016,543, Cl. 340-172.500.

Frappart, Pierre, to L.C.C.-C.I.C.E.-Compagnie Europeenne de Composants Electroniques. Subminiaturized adjustable capacitor. 4,016,466, Cl. 361-278.000.

Fraser, James Girvan: *See—*
Alexander, William; Causa, Alfredo Guillermo; and Fraser, James Girvan, 4,016,142.

Fraser Sweatman, Inc.: *See—*
Connolly, Edward A., 4,015,617.

Fraze, Ermal C.: *See—*
Brown, Omar L., 4,015,744.

Frazee, Lawrence E., to Plessey Incorporated. Humidity sensor, material therefor and method. 4,016,308, Cl. 427-125.000.

Freborg, Lehner C.: *See—*
Kamin, Arthur; Evans, Clifford A.; and Freborg, Lehner C., 4,015,481.

Fresnel, Jean-Marie; and Trosset, Daniele, to Battelle Memorial Institute. Method and apparatus for governing the reaction rate of enzymatic reactions. 4,016,044, Cl. 195-115.000.

Friedman, Harvey S., to Polaroid Corporation. Processing fluid flow control device for self developing camera. 4,016,578, Cl. 354-86.000.

Friesenbichler, Eduard. Railway switch or railway crossing. 4,015,805, Cl. 246-458.000.

Fruehauf Corporation: *See—*
Hulverson, Adrian F.; and Chosy, Eugene, 4,015,876.

Frumkin, Mikhail Evseevich: *See—*
Anikanov, Nikolai Ivanovich; Baburin, Evgeny Arkadievich; Grachev, Leonid Pavlovich; Zax, Grigory Iosifovich; Radutsky, Grigory Avramovich; Frumkin, Mikhail Evseevich; and Kheifets, Rafail Efimovich, 4,015,404.

Fuel Injection Development Corporation: *See—*
Leshner, Ervin; and Leshner, Michael D., 4,015,569.
Leshner, Ervin; and Leshner, Michael D., 4,015,572.

Fuji Oil Company, Ltd.: *See—*
Fujimaki, Masao; Arai, Soichi; and Watanabe, Michiko, 4,016,147.

Fuji Photo Film Co., Ltd.: *See—*
Abe, Eiji; Ohta, Takahisa; and Urata, Mitsuharu, 4,016,406.
Dezawa, Shin-ichiro; and Tamai, Yasuo, 4,016,057.
Oishi, Yasushi; and Hinata, Masanao, 4,015,989.
Saeki, Keiso; and Matsukawa, Hiroharu, 4,016,098.
Shiba, Keisuke; Hirose, Takeshi; Hayashi, Jun; and Aono, Toshiaki, 4,015,988.

Fujiki, Norio, to Nissan Motor Co., Ltd. Method for avoiding unwanted echo signals and automotive radar embodying same. 4,016,566, Cl. 343-7.0VM.

Fujikura Kasei Co., Ltd.: *See—*
Wakabayashi, Yukimasa; and Takahashi, Shigeru, 4,016,305.

Fujimaki, Masao; Arai, Soichi; and Watanabe, Michiko, to Fuji Oil Company, Ltd. Method for preparation of low-phenylalanine plastein. 4,016,147, Cl. 260-112.00R.

Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, to Sumitomo Chemical Company, Limited. Certain esters of 2-substituted-4-hydroxy-cyclopent-2-enones. 4,016,179, Cl. 260-347.500.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
Kariyone, Kazuo; Yagi, Hideo; and Yoshida, Kazuhiko, 4,016,205.
Takaya, Takao; and Masugi, Takashi, 4,016,160.
Tamura, Saburo; Takematsu, Tetsuo; and Haruta, Hisae, 4,015,975.

Fujiwara, Kunitaka: *See—*
Miyamoto, Kozo; and Fujiwara, Kunitaka, 4,015,937.

Fukuma, Nobuo; and Matsubara, Hideyuki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Cam-controlled grinding method. 4,015,372, Cl. 51-281.00R.

Fukuroi, Takeo, to Yoshida Kogyo Kabushiki Kaisha. Interlockable sliders. 4,015,457, Cl. 70-68.000.

Fukushima, Masami: *See—*
Yanagisawa, Hiroaki; Ando, Akiko; Fukushima, Masami; and Nakao, Hideo, 4,016,155.

Fulenwider, John E., to GTE Laboratories Incorporated. Optically encoded acoustic to digital transducer. 4,016,556, Cl. 340-347.00P.

Fumei, Giancarlo J.; and Karabedian, James A., to Owens-Illinois, Inc. Laminated structures and methods and compositions for producing same. 4,016,126, Cl. 260-29.6RB.

Fumei, Giancarlo J.; and Karabedian, James A., to Owens-Illinois, Inc. Laminated structures and methods and compositions for producing same. 4,016,327, Cl. 428-314.000.

Furuichi, Etsuko: *See—*
Karasaki, Tadashi; Hayashi, Chikako; and Furuichi, Etsuko, 4,016,260.

Furuichi, Katsushi: *See—*
Inuzuka, Tsuneki; Furuichi, Katsushi; Sawamura, Osamu; Kimura, Yoshimasa; and Sakamaki, Hisashi, 4,016,529.

Furukawa, Nobuhiko: *See—*
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G. Lufft Metallbarometerfabrik: *See—*
Pott, Otto Friedrich, 4,015,463.

Gabor, Andrew; and Cocksedge, Kenneth W., to Xerox Corporation. Electrical centering and boring system for transducers. 4,016,470, Cl. 318-606.000.

Gaboriault, Roger E.: *See—*
Folsom, Lawrence R.; O'Brien, John F.; Gaboriault, Roger E.; Haberstroh, August J.; and Mancuso, Ettore J., Jr., 4,015,511.

GAF Corporation: *See—*
Chang, Charles Hung, 4,016,181.

Gajjar, Bharat Jaybhadra, to Du Pont de Nemours, E. I., and Company. Warp knit fabric. 4,015,451, Cl. 66-195.000.

Gale, Geoffrey N.; Colbourne, Edwin Denis; and Hollins, Michael J., to Bowmar Canada Limited. Light emitting diode display. 4,016,449, Cl. 313-500.000.

Galland, Jacques; Boutard nee Gabillet, Dominique; and Chene, Jacques, to Agence Nationale de Valorisation de la Recherche (ANVAR). Surface treatment process for steels and article. 4,015,950, Cl. 428-648.000.

Gallet, Bernard; and Venot, Robert, to Commissariat a l'Energie Atomique. Fuel assembly support column for a nuclear reactor diagrid. 4,016,035, Cl. 176-87.000.

Gamble, James R., to Westinghouse Electric Corporation. Insulating bushing assembly. 4,016,359, Cl. 174-153.00R.

Gambro AG: *See—*
Riede, Gerhard; and Boberg, Gunnar, 4,016,082.

Gamet, Brigitte; and Renard, Jean-Claude, to Compagnie Generale d'Electricite. Superconductive switch. 4,016,526, Cl. 338-325.000.

Gandon, Louis; and Demarthe, Jean-Michel, to Imetal. Hydrometallurgical treatment process for extracting constituent metal values from ferro-nickel. 4,016,054, Cl. 204-105.00R.

Gandon, Louis; Jean, Roger; and Solar, Serge, to Societe Metallurgique Le Nickel SLN. Method of extracting constituent metal values from polymetallic nodules from the sea. 4,016,055, Cl. 204-106.000.

Ganter-Ullmann, Karl; Neussel, Paul; Abermeth, Hubert; Wahnschaffe, Jurgen; and Klier, Heiner, to Klockner-Humboldt-Deutz Aktiengesellschaft. Crank shaft for a multi-cylinder short stroke internal combustion engine. 4,015,485, Cl. 74-596.000.

Gaponov, Vasily Alexandrovich: *See—*
Budker, Gersh Itskovich; Gaponov, Vasily Alexandrovich; Korabelnikov, Boris Mikhailovich; Krainov, Gennady Sergeevich; Kuznetsov, Sergei Alexandrovich; Kuksanov, Nikolai Konstantinovich; Kondratiev, Vasily Ivanovich; and Salimov, Rustam Abelevich, 4,016,499.

Garito, Anthony Frank; Heeger, Alan J.; MacDiarmid, Alan G.; Bright, Arthur A.; Cohen, Marshall J.; and Mikulski, Chester M., to University of Pennsylvania, The Trustees of the. Composite polymeric material formed with an epitaxial crystalline film of polymeric sulfur nitride, and method of preparing same. 4,016,331, Cl. 428-421.000.

Garner, Gerald D.: *See—*
Rollins, Dallas W.; Randolph, Robert W.; and Garner, Gerald D., 4,015,751.

Garrett Corporation, The: *See—*
Kinsell, Robert C.; Noe, James C.; and Byrne, John P., 4,015,438.

Garrett, Robert A.: *See—*
Silva, John; Garrett, Robert A.; Borkat, Franklin R.; and Young, Frank, 4,015,677.

Garry, Robert F., to United States of America, Navy. Process for making chip carriers using anodized aluminum. 4,015,987, Cl. 96-36.200.

Gaske, Joseph E.; and Georgas, Nick T., to DeSoto, Inc. Radiation curable coatings having nonadherent surfaces. 4,016,333, Cl. 428-447.000.

Gates Rubber Company, The: *See—*
McPhee, Donald J.; and Newberry, Mark A., 4,015,918.

Geddry, Bernard L.: *See—*
Arkind, Kenneth D.; and Geddry, Bernard L., 4,016,570.

Gee, James E.; and Stedman, Robert N., to Caterpillar Tractor Co. Ripper assembly for tractor drawn scraper. 4,015,348, Cl. 37-124.000.

Gehrmann, Klaus; Ohorodnik, Alexander; Lohmar, Elmar; and Riechmann, Wernfried, to Hoechst Aktiengesellschaft. Distillative purification of 2,5-dioxo-1-oxa-2-phospholanes. 4,016,048, Cl. 203-49.000.

Gelardi, Anthony L.; and Mathus, Gregory, to Morningstar Corporation of Cambridge, The. Tape cartridge. 4,015,790, Cl. 242-55.19A.

Geldzahler, Charles; and Sodhi, Satwant S., to Starlite Chemicals, Inc. Additives for bright plating nickel, cobalt and nickel-cobalt alloys. 4,016,051, Cl. 204-43.00T.

Gelzheiser, Francis L.; and DeAngelo, Gerald J., to Westinghouse Electric Corporation. Circuit breaker line terminal. 4,016,386, Cl. 200-250.000.

General Atomic Company: *See—*
Bokros, Jack C.; and Slivenko, Victor, 4,015,601.

General Dynamics Corporation: *See—*
Slysh, Paul; and Siden, LeRoy E., 4,015,653.

General Electric Company: *See—*
Bishop, Everett Reece; and Leroux, Marcel Henri, 4,016,558.
Blodgett, Fredrick M., Jr.; and Schuyler, Peter B., 4,015,508.
Folsom, Lawrence R.; O'Brien, John F.; Gaboriault, Roger E.; Haberstroh, August J.; and Mancuso, Ettore J., Jr., 4,015,511.
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Gross, William B., 4,016,493.
Horning, Albert Emerson, 4,016,328.
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Schumacher, Frank A., 4,015,442.
Willis, Candler A., 4,016,452.
Ziemba, Richard Thomas, 4,015,531.

General Latex and Chemical Corporation: *See—*
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General Mills Chemicals, Inc.: *See—*
MacKay, Kenneth D.; and Sudderth, R. Brantley, 4,015,980.

General Signal Corporation: *See—*
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General Tire & Rubber Company, The: *See—*
Elmer, Otto C., 4,016,119.

Genin, Robert, to Jardine Industries, Inc. Mini electronic calculator with blackboard display format. 4,016,411, Cl. 235-156.000.

Gent, John Arthur Gooch: *See—*
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Georgas, Nick T.: *See—*
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Georgeaux, Andre: *See—*
Demarthe, Jean-Michel; Georgeaux, Andre; and Sonntag, Alain, 4,016,056.

Gerhardt, Leslie L. Apparatus for stabilizing a mobile home roof. 4,015,376, Cl. 52-23.000.

Gerrits, Theodorus Petrus Hubertus: *See—*
Brouwer, Gerardus Johannes; and Gerrits, Theodorus Petrus Hubertus, 4,015,666.

Gerum, Erich, to DIEHL. Switch-off device for electrically operated clock alarm and control therefor. 4,016,562, Cl. 340-384.00E.

Geurts, Leonardus H.: *See—*
Schaafsma, Sijbrandus E.; and Geurts, Leonardus H., 4,016,175.

Ghiringhelli, Horace, to Isodyne Inc. Novel multi-path leakage transformer and inverter ballast. 4,016,477, Cl. 321-26.000.

Gibson, Christian D.; and Hart, Kenneth F., to Raymond Corporation, The. Material-handling apparatus. 4,015,738, Cl. 214-674.000.

Gibson, Ross E. Maze-type puzzle. 4,015,852, Cl. 273-153.00R.

Gieles, Antonius Cornelis Maria: *See—*
Kleuters, Wilhelm Josef; and Gieles, Antonius Cornelis Maria, 4,015,473.

Giers, Alfred J., to Carl Schenck AG. Balancing method and apparatus. 4,015,480, Cl. 73-462.000.

Gilbert, Richard, to Stanley Tools Limited. Wood planes. 4,015,649, Cl. 145-11.000.

Gilden, Meyer: *See—*
Reeder, Thomas M.; and Gilden, Meyer, 4,016,514.

Gillet, Roger, to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM); and Electricite de France (Service National). Rotor for an electric machine having a cryo-inductor. 4,016,444, Cl. 310-261.000.

Gilmour, Campbell Moore: *See—*
Beck, Sidney Marion; and Gilmour, Campbell Moore, 4,016,065.

Giolitti, Nicolo; and Bovio, Michele, to Ing. C. Olivetti & C., S.p.A. Cartridge for endless magnetic-tape loop and device for recording and/or reading thereof. 4,016,602, Cl. 360-132.000.

Glabe, Elmer F.; Anderson, Perry W.; and Laftsidis, Stergios, to Food Technology Products. Animal feeds for herbivorous domestic animals. 4,016,294, Cl. 426-72.000.

Glacier Metal Company Limited, The: *See—*
Baker, Dennis Stanley; and Davies, Glyndwr John, 4,015,949.

Glaesel, Gottfried, to Heco Electric GmbH. Identification member for electrical terminals. 4,015,890, Cl. 339-113.00B.

Glaxo Laboratories Limited: *See—*
Phillipps, Gordon Hanley; English, Alan Frederick; and Stribley, Gillian Helen, 4,016,271.

Gobel, Wilhelm: *See—*
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Goeth, Hanns: *See—*
Wetzel, Bernd; Woitun, Eberhard; Maier, Roland; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,016,263.

Goff, Richard Everett, Jr.; Guay, Normand Daniel; and Priestley, Joseph Amos, to Johnson & Johnson. Cushioned narrow woven tubular fabric. 4,015,641, Cl. 139-384.00R.

Goffredo, Daniel L.; and Shakley, Conrad Dale, to Chemcut Corporation. Connecting modules for an etching system. 4,015,706, Cl. 198-780.000.

Goheen, David W.; Fahey, Michael D.; and Claussen, Harvey L., to Crown Zellerbach Corporation. Process for producing organic acid esters of cellulose. 4,016,353, Cl. 536-69.000.

Golbeck, Bernard J.; Lewandowski, Raymond F.; and Markinson, William C., to Oak Industries Inc. Keyboard switch. 4,016,388, Cl. 200-314.000.

Golden, Steven T. Drapery pleating and finishing machine. 4,015,748, Cl. 223-32.000.

Goldenberg, Marvin M.; and Honkomp, Leroy J., to Morton-Norwich Products, Inc. Method of combatting gastric ulceration. 4,016,268, Cl. 424-231.000.

Goldshtein, Boris Grigorievich: *See—*
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.

Golioto, Igor, to Bell Telephone Laboratories, Incorporated. High voltage transfer switch with cam controlled overlap during transfer. 4,016,385, Cl. 200-153.00L.

Goll, Jeffrey H. Broadband electroacoustic converter. 4,016,530, Cl. 340-15.000.

Goodyear Tire & Rubber Company, The: *See—*
Harris, James T., 4,015,652.
Smith, Edwin Studley; and Marshall, Richard A., 4,016,350.

Goppen, Albert Adlofovich: *See—*
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.

Goransson, Pehr Gunnar Heine, to Rottneros Bag System AB. Tubes for the production of carrier bags with lateral accordion folds. 4,015,635, Cl. 138-119.000.

Gordon, Paul, to Strategic Medical Research Corporation. Therapeutic composition and method of therapeutically treating warm blooded animals therewith. 4,016,261, Cl. 424-180.000.

Gordon, Richard J.: *See—*
Wright, Harold G.; and Gordon, Richard J., 4,015,737.

Gostling, Peter Eric, to C. Evans & Sons Limited. Puncheon unit for builders scaffolding. 4,015,395, Cl. 52-637.000.

Goto, Kazuhiro: *See—*
Kobayakawa, Toshihiro; Yasuda, Hiroshi; Goto, Kazuhiro; and Nakanishi, Michio, 4,016,276.

Gottsdanker, Robert M. Testing apparatus. 4,015,343, Cl. 35-22.00R.

Gould Inc.: *See—*
Kelm, Roger William, 4,015,708.

Graafsma, Richard S.; and Nehrig, R. Harlan, to Auto Specialties Manufacturing Company. Tiltable jack. 4,015,825, Cl. 254-101.000.

Grachev, Leonid Pavlovich: *See—*
Anikanov, Nikolai Ivanovich; Baburin, Evgeny Arkadievich; Grachev, Leonid Pavlovich; Zax, Grigory Iosifovich; Radutsky, Grigory Avramovich; Frumkin, Mikhail Evseevich; and Kheifets, Rafail Efimovich, 4,015,404.

Graef, Harry T.; Hansen, Kenneth R.; and Morrison, Larry A., to Diebold, Incorporated. Interior railway transportation system. 4,015,537, Cl. 104-91.000.

Graf, Carlton E., to General Electric Company. Controlled rectifier motor drive system including d.c. fault detection and commutation means. 4,016,468, Cl. 318-434.000.

Graf, Martin, to Grob & Co. Aktiengesellschaft. Heddle frame on which the lateral supports are detachably connected to the frame staves. 4,015,638, Cl. 139-91.000.
Graham, Robert H., to R. A. Pearson Company. Plug pad inserting apparatus for carton forming machines. 4,015,516, Cl. 93-36.300.
Graham, Thomas Andrew. Bookholder. 4,015,813, Cl. 248-452.000.
Grand Machining Company: *See—*
Romano, Ralph, 4,015,503.
Granite, Bernard H. Device for reducing polymers or the like to substantially uniform small size pieces. 4,015,782, Cl. 241-62.000.
Grantham, Frederick W. Continuous laundry drying apparatus. 4,015,930, Cl. 432-105.000.
Grantham, Frederick W. Extractor for airborne particulate matter. 4,015,957, Cl. 55-227.000.
Graphic Controls Corporation: *See—*
Hubbard, James R., 4,016,572.
Graviner Limited: *See—*
Farquhar, Robert L.; and Snook, Phillip D., 4,016,425.
Gray, Thomas J.; and Wojtowicz, Jan, to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Salt water battery. 4,016,339, Cl. 429-219.000.
Grayston, Judson M., to Machinery Brokers, Inc. Grinding wheel assembly. 4,015,371, Cl. 51-168.000.
Green, Howard; and Rheinwald, James G., to Massachusetts Institute of Technology. Process for serially culturing keratinocytes. 4,016,036, Cl. 195-1.800.
Greenwood, Charles Trevour, to United States of America, Navy. Preparation of pharmacologically active hydroxyalkyl starch. 4,016,354, Cl. 536-111.000.
Greer Hydraulics, Inc.: *See—*
Zahid, Abduz, 4,015,819.
Gretag Aktiengesellschaft: *See—*
Keller, Edwin, 4,015,703.
Grevich, John J., to Domain Industries, Inc. Segmented heater for band sealers. 4,016,026, Cl. 156-555.000.
Greyson, Jerome; and Stiso, Sisto Nicholas, to Miles Laboratories, Inc. Device and method for the determination of the specific gravity or osmolality of a liquid. 4,015,462, Cl. 73-32.00R.
Griffin, Gerald Joseph Louis, to Coloroll Limited. Biodegradable synthetic resin sheet material containing starch and a fatty material. 4,016,117, Cl. 260-17.4ST.
Griffoul, Marcel P.: *See—*
Orth, Charles D.; and Griffoul, Marcel P., 4,015,776.
Grinev, Alexei Nikolaevich: *See—*
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.
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Grolig, Johann: *See—*
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Gronbach, Wilhelm. Hinge with compressions spring for counterbalancing weight of leaves. 4,015,309, Cl. 16-190.000.
Groot, Jan: *See—*
Anders, Herbert; Bullens, Antonius Adrianus Maria; Groot, Jan; Otten, Johannes Henricus Bernardus; Stoof, Hendrikus Christiaan Josephus; and Vloemans, Carolus Leopoldus, 4,016,478.
Gross, William B., to General Electric Company. Simplified land line and satellite communication switching system. 4,016,493, Cl. 325-4.000.
Grote, George A., to Beach Precision Parts Co. In-line filter for gases. 4,015,959, Cl. 55-274.000.
Groupement pour les Activities Atomiques et Advancees "GAAA": *See—*
Meyer, Andre, 4,016,096.
Gruber, Gunter: *See—*
Schnee, Karl; Tichy, Dieter; Michel, Walter; and Gruber, Gunter, 4,016,336.
Gruetter, Walter; and Bron, Jean-Daniel, to J. Bobst & Fils, S.A. Sheet conveying device for a platen press. 4,015,844, Cl. 271-266.000.
Gruffaz, Max; and Rollet, Bernard, to Rhone-Poulenc Industries. Heat-stable cellular materials. 4,016,114, Cl. 260-2.50N.
Grumman Aerospace Corporation: *See—*
Tobin, Albert G., 4,016,229.
Vroom, Henry J.; Bolle, Warren Robert; Schneider, Herbert; and Swerdling, Burton, 4,015,586.
Grunau Company, Inc.: *See—*
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GTE Automatic Electric Laboratories Incorporated: *See—*
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GTE Laboratories Incorporated: *See—*
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GTE Sylvania Incorporated: *See—*
Cassidy, Robert L.; Cosco, Robert J.; and Pappas, John A., 4,016,445.
Guay, Normand Daniel: *See—*
Goff, Richard Everett, Jr.; Guay, Normand Daniel; and Priestley, Joseph Amos, 4,015,641.
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Gulf Research & Development Company: *See—*
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Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,016,070.
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Onopchenko, Anatoli; and Schulz, Johann G. D., 4,016,206.
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Gunderman, Roland E.: *See—*
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Gunnerman, Rudolf Wilhelm. Fuel pellets and method for making them from organic fibrous materials. 4,015,951, Cl. 44-10.00E.
Gunther, W. H. H.: *See—*
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Gutman, Arnold D., to Stauffer Chemical Company. N-Alkylthiomethylacetamidephosphorodithioate insecticides. 4,016,266, Cl. 424-211.000.
Gutridge, Jack E.; and Raidt, Patricia A., to Pullman Incorporated. Convertible headrest for sleeping cars. 4,015,542, Cl. 105-322.000.
Gutterman, Eric D., to Beck, Allan S. Power switching circuit. 4,016,428, Cl. 307-116.000.
H. J. Langen & Sons Ltd.: *See—*
Langen, Marinus J. M., 4,015,403.
Haag, Werner O.; and Olson, David H., to Mobil Oil Corporation. Alkylation in presence of thermally modified crystalline aluminosilicate catalyst. 4,016,218, Cl. 260-671.00R.
Haas, Dieter, to Blaupunkt-Werke GmbH. Printed circuit coils. 4,016,519, Cl. 336-200.000.
Haas, Lothar: *See—*
Weckenmann, Albert; Haas, Lothar; and Brautigam, Rolf, 4,016,490.
Haberman, Louis B. Parabolic solar energy heat exchanger. 4,015,584, Cl. 126-271.000.
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Hachiya, Terumi: *See—*
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Haines, Richard M.: *See—*
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Hakanson, Karin, to Levi Strauss & Co. Method of skewing twill fabric to avoid leg twist. 4,015,318, Cl. 28-72.00R.
Haldeman, Charles W., to United States of America, Air Force. Ablative protective material for reentry bodies. 4,016,322, Cl. 428-246.000.
Hall, Arthur D., III, to Advanced Decision Handling, Inc. Highly automated agricultural production system. 4,015,366, Cl. 47-1.00R.
Hall, Michael John: *See—*
Atherton, Frank Ratcliffe; Hall, Michael John; Hassall, Cedric Herbert; Ringrose, Peter Stuart; and Lambert, Robert Wilson, 4,016,148.
Hall, Robert Gilmore, to BOC Limited. Powder forming. 4,015,780, Cl. 241-23.000.
Hall, Virginia E.: *See—*
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Hallco Inc.: *See—*
Cowans, Beatrice L.; and Hall, Virginia E., 4,016,314.
Hallenbeck, Richard A., to Pitney-Bowes, Inc. Servodrive apparatus for driving the postage printing drum in a postage meter. 4,016,467, Cl. 318-604.000.
Halton, Murray; Dow, Norris F.; Dow, Richard M.; and Hillebrand, Michael J., to N.F. Doweave, Inc. Triaxial fabric forming machine and components thereof. 4,015,637, Cl. 139-11.000.
Hamada, Kenzo; and Uchiyama, Hiroshi, to E. C. Chemical Industries & Co., Ltd.; and C. Itch & Co., Ltd. Polyolefin plastic compositions. 4,016,118, Cl. 260-17.4SG.
Hamada, Mitsuharu, to Nissan Motor Co., Ltd. Transportation system and vehicles therefor. 4,015,539, Cl. 104-130.000.
Hambro Structural Systems Ltd.: *See—*
Butts, Ernest Otto; and Laurus, Felix F., 4,015,396.
Hambuch, Johannes: *See—*
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Hammad, Mohamad, to Rockwell International Corporation. Frequency tone detection. 4,016,371, Cl. 179-84.0VF.
Hanff, Ludovic F. Automatic watering device. 4,015,616, Cl. 137-78.000.
Hanff, Roy A. Apparatus for improving fuel-air mixture. 4,015,574, Cl. 123-141.000.
Hanopole, Irwin, to Magla Products. Floating net display apparatus. 4,015,719, Cl. 211-133.000.
Hansen, Kenneth R.: *See—*
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Hansen, Robert L.: *See—*
Pavlik, Frank J.; and Hansen, Robert L., 4,015,612.
Hardman, James A. Oil free compressor. 4,015,915, Cl. 417-490.000.
Harmon, Kenneth E.; and Mayers, John L., to United States of America, Air Force. Bolted paired vanes for turbine. 4,015,910, Cl. 415-217.000.
Harnisch, Horst, to Bayer Aktiengesellschaft. Azolindolines and azolindoline dyestuffs. 4,016,172, Cl. 260-307.00D.
Harrington, Colin John: *See—*
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Harris, James T., to Goodyear Tire & Rubber Company, The. Tire and rim assembly. 4,015,652, Cl. 152-379.100.
Harris, Wilbur E., to Uniroyal Inc. Slit raw rubber article. 4,016,320, Cl. 428-131.000.
Hart, Jack B.: *See—*
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Hart, Kenneth F.: *See—*
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Hassan, Javathu K.; and Rabstejnek, Carl V., to International Business Machines Corporation. Precision tool and workpiece positioning apparatus. 4,016,396, Cl. 219-121.0EB.
Hata, Yoshitaka: *See—*
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Hatano, Satoshi: *See—*
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Havens, Richard Calvin, to Motorola, Inc. Solid state microwave oscillator using coupled TEM transmission lines. 4,016,507, Cl. 331-96.000.
Hawkins, Carl J., to Rowe Industries Division of Coleman Cable & Wire Company. Method for molding articles of thermoplastic sheet materials. 4,016,231, Cl. 264-92.000.
Hawthorne, Arthur L.; and Hazen, David R., to Consolidation Coal Company. Apparatus for unitizing a pair of augers. 4,015,674, Cl. 175-91.000.
Hayakawa, Shigeru: *See—*
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Hayashida, Yoshihiro; and Amano, Haruyuki, to Tokico Ltd. Lining wear adjuster. 4,015,693, Cl. 188-79.50P.
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Hayes, Stephen, to Ewarts Limited. Gas taps. 4,015,631, Cl. 137-625.330.
Hayward, John S.; Collis, Martin S.; Eckerson, John D.; and Rosenblood, Lorne K. Flotation jacket. 4,015,300, Cl. 9-341.000.
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Hearon, William Montgomery; Witte, John F.; and Lo, Cheng Fan, to Boise Cascade Corporation. Hydrolyzing di- and tricarboxy celluloses with sulfurous acid. 4,016,207, Cl. 260-528.000.
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Heberlein & Co. AG: *See—*
Slavik, Valter; and Meisser, Marc, 4,015,786.
Hecht, Meinhard; and Kubiak, Herbert, to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft. Production of longitudinally welded pipe. 4,016,394, Cl. 219-61.000.
Heco Electric GmbH: *See—*
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Heesch, Max Otto, to International Telephone and Telegraph Corporation. Seat adjustment mechanism. 4,015,812, Cl. 248-394.000.
Hegel, Robert W.; and West, Burke A., to Monroe Auto Equipment Company. Vehicle leveling system. 4,015,859, Cl. 280-714.000.
Heilmayr, Peter F., to Certain-teed Products Corporation. Extrusion equipment and especially die structure for making plastic siding. 4,015,925, Cl. 425-461.000.
Heimbach, Heinrich: *See—*
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Heinz, Harro K.; and Cahill, Bernard S., to Rauland-Borg Corporation. Dynamic range extender circuit for preamplifier. 4,016,502, Cl. 330-29.000.
Heinze, George E.: *See—*
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Helszajn, Joseph, to National Research Development Corporation. Waveguide circulators. 4,016,509, Cl. 333-1.100.
Hemfort, Heinrich, to Westfalia Separator AG. Continuously operating centrifuge drum for the sterilization of liquids. 4,015,772, Cl. 233-20.00A.
Hemminger, James W., to PPG Industries, Inc. Retaining clip for a divisior bar. 4,015,388, Cl. 52-395.000.
Hemminger, William F., to Pandick Press, Inc. Film take-up reel. 4,015,793, Cl. 242-74.000.
Henkel & Cie G.m.b.H.: *See—*
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Henkes, John L., Jr.: *See—*
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Henle, Robert Athanasius; and Ho, Irving Tze, to International Business Machines Corporation. Optimal driver for LSI. 4,016,431, Cl. 307-208.000.
Hennart, Claude, to Airwick Industries, Inc. Granular products for soil treatment. 4,015,970, Cl. 71-11.000.
Hennessy, James J., to Hennessy Products, Incorporated. Railway axle end cap screw locking device. 4,015,874, Cl. 295-36.00R.
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Heredia, Romeo Victor. Kite construction. 4,015,802, Cl. 244-153.00R.
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Herr, John Addison; Jaffe, Wolfgang; Dob, Allan Matthew; Minalga, Philip Francis; Adams, Kenneth Douglas; and Herron, William Lee, to Singer Company, The. Linear motor. 4,016,441, Cl. 310-13.000.
Herrick, George R., to Caterpillar Tractor Co. Fume extraction control for welding gun. 4,016,398, Cl. 219-130.000.
Herron, William Lee: *See—*
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Herzl, Peter J., to Fischer & Porter Co. Two-wire transmission system for vortex flowmeter. 4,015,472, Cl. 73-194.00B.
Hess, Patrick H., to Chevron Research Company. Method for delaying the setting of an acid-settable liquid in a terrestrial zone. 4,015,995, Cl. 106-287.00S.
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Higuchi, Takeru; and Hussain, Anwar, to Alza Corporation. Vaginal drug dispensing device. 4,016,251, Cl. 424-15.000.

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Hinsche, Friedrich; and Schaupp, Kurt, to Bayer Aktiengesellschaft. Production of synthetic anhydrite. 4,016,240, Cl. 423-170.000.

Hiraishi, Shigetoshi: *See—*
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Hirata, Haruyoshi: *See—*
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Hirose, Ryusho, to Canon Kabushiki Kaisha. Zoom lens system having enlarged range of variation in magnification. 4,015,895, Cl. 350-183.000.

Hirose, Takeshi: *See—*
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Hobo, Nobuhito; and Kaga, Sumihiro, to Nippondenso Co., Ltd. Fuel control system. 4,015,426, Cl. 60-39.28R.

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Hodges, Eugene Walton, III; Steel, Francis Robert; and Enderby, Ralph Thomas, to Motorola, Inc. Broadband two-port isolator. 4,016,510, Cl. 333-24.200.

Hodgson, Brian, to Charles Churchill Limited. Mounting for rotary machine tool particularly for gear hobbing machines. 4,015,510, Cl. 90-20.500.

Hoechst Aktiengesellschaft: *See—*
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Hoesch Werke Aktiengesellschaft: *See—*
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Pluschkell, Wolfgang; and Wisnewski, Heinrich, 4,015,475.
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Hoff, Raymond E.; and Shida, Mitsuzo, to Chemplex Company. Tetravalent chromium alkoxide polymerization catalyst and method. 4,016,343, Cl. 526-96.000.

Hoffmann-La Roche Inc.: *See—*
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Hofmeister, Helmut; Annen, Klaus; Wiechert, Rudolf; and Laurent, Henry, to Schering Aktiengesellschaft. 17α-hydroxy-1,3,5(10),15-estratetraenes and process for their production. 4,016,269, Cl. 424-241.000.

Hoks, Dirk, to Stork Werkspoor Sugar B.V.; and Suiker Unie Holding B.V. Method and device for obtaining sugar crystals from a sugar solution. 4,016,001, Cl. 127-16.000.

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Hollins, Michael J.: *See—*
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Holmes, David Alan, to Du Pont de Nemours, E. I., and Company. Process for polymerizing tetrafluoroethylene in aqueous dispersion. 4,016,345, Cl. 526-206.000.

Holst, Arno; Kostrzewa, Michael; and Lask, Helmut, to Hoechst Aktiengesellschaft. Cigarette filter. 4,015,611, Cl. 131-268.000.

Holt, James F., to United States of America, Air Force. Enthalpy augmentation to MHD generation. 4,016,438, Cl. 310-11.000.

Holum, Edward T., to Holum & Sons Co., Inc. Easel binder. 4,015,863, Cl. 281-33.000.

Holum & Sons Co., Inc.: *See—*
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Hood, David Edward. Process for improving the color stability of fresh meat. 4,016,292, Cl. 426-2.000.

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Hordvik, Audun: *See—*
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Horiye, Masakazu; Sasaki, Kenichi; and Konno, Mitsutaka, to Nissan Motor Co., Ltd. Intake manifold pressure regulator of internal combustion engine. 4,015,568, Cl. 123-124.00R.

Horner, Herbert F., Jr.: *See—*
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Horner, James F.; and Jackson, William D., to Hewlett-Packard Company. Dual polarity pulse detection circuit with variable voltage threshold. 4,016,552, Cl. 340-253.00C.

Horner, Patrick James; and Brown, John Peter, to Imperial Chemical Industries Limited. Crystallization process. 4,016,210, Cl. 260-607.0AR.

Horner, Sven Henry Nilsson: *See—*
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Horning, Albert Emerson, to General Electric Company. Silicone pressure-sensitive adhesives and tapes. 4,016,328, Cl. 428-355.000.

Horrocks, Donald L.; and Klein, Paul R., to Beckman Instruments, Inc. Method of radioactivity analysis. 4,016,418, Cl. 250-252.000.

Horvallius, Torgny William, to Aktiebolaget SAMEFA. Measuring tool for frameworks. 4,015,339, Cl. 33-288.000.
Horvath, Stephen, to Access Control Systems Pty. Ltd. Catch mechanism. 4,015,869, Cl. 292-341.160.
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Howard, Willard L.; and Rogers, Ryland F., to Xerox Corporation. Anti-gravitational cascade development for electrostatic processors. 4,015,561, Cl. 118-654.000.
Howorth, Ronald, to BTR Industries Limited. Glazing structures. 4,015,390, Cl. 52-495.000.
Hsu, Jau Yann, to Societe d'Assistance Technique Pour Produits Nestle S.A. Water-dispersible composition and method for production. 4,016,337, Cl. 426-99.000.
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Hull, Charles W.; Whitehead, T. Wilson; and Colby, Bruce N., to Du Pont de Nemours, E. I., and Company. Analytical apparatus with variable energy ion beam source. 4,016,421, Cl. 250-281.000.
Hulverson, Adrian F.; and Chosy, Eugene, to Fruehauf Corporation. Wedge type trailer body. 4,015,876, Cl. 296-28.00M.
Hummel, Wiley M., to General Electric Company. Thermostat and anticipator therefor and methods of operating and making such. 4,016,520, Cl. 337-100.000.
Humphrey Instruments, Inc.: *See*—
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Humphrey, William E., to Humphrey Instruments, Inc. Eye test apparatus with physician routed patient input adjustment to variable optical elements. 4,015,899, Cl. 351-17.000.
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Hurst, Eric Kenneth, to Lewis Woolf Griptight Limited. Infants feeding bottle. 4,015,740, Cl. 215-11.00C.
Hurst, William Dan; Huffman, Donald E.; King, Hermon A.; and Puckett, Jack, to Dixie Yarns, Inc. Yarn tape deweaving method and apparatus. 4,015,314, Cl. 28-17.000.
Hussain, Anwar: *See*—
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Hutchison, John Blundell. Termination of electric cables. 4,015,329, Cl. 29-628.000.
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Hyatt, Gilbert Peter. Apparatus and method for providing interactive audio communication. 4,016,540, Cl. 340-172.500.
Hyosu, Yoshihiko; Miyashita, Eiiti; Kuzuba, Noboru; Miyahara, Sadayasu; and Takano, Ryoshiro, to Sinloihi Co. Fluorescent colored resin particles and process for preparation thereof. 4,016,133, Cl. 260-42.210.
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Ikegami, Yoshio; Kimura, Hirohumi; and Kohge, Tadashi, to Kobe Steel Ltd. Method and apparatus for treating the terminal of a wire-like object in a wire-like object take-up apparatus. 4,015,785, Cl. 242-25.00A.
Ikeura, Kenji: *See*—
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Ing. C. Olivetti & C., S.p.A.: *See*—
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Anderson, Richard L.; Clifton, Jack K.; Masi, James V.; and Merrin, Seymour, 4,016,586.
Inoue, Morio: *See*—
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Inoue, Tadahiko; Dowke, Gosaburo; and Itoh, Hideo, to Sandoz, Inc. Synergistic insecticidal compositions containing β-exotoxin. 4,016,265, Cl. 424-200.000.
Institut Dr. Friedrich Forster, Prufgeratebau: *See*—
Neumaier, Peter, 4,016,487.
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De La Moneda, Francisco H., 4,016,587.
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International Nickel Company, Inc., The: *See*—
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International Standard Electric Corporation: *See*—
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International Telephone and Telegraph Corporation: *See*—
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Inuzuka, Tsuneki; Furuichi, Katsushi; Sawamura, Osamu; Kimura, Yoshimasa; and Sakamaki, Hisashi, to Canon Kabushiki Kaisha. Body detecting device. 4,016,529, Cl. 340-1.00R.
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Ipri, Alfred Charles, to RCA Corporation. Method of simultaneously forming a polycrystalline silicon gate and a single crystal extension of said gate in silicon on sapphire MOS devices. 4,016,016, Cl. 148-175.000.
Irmscher, Klaus: *See*—
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Ishida, Nakao; Kitame, Fumio; Utsushikawa, Kuniko; Kohama, Tomoaki; Saito, Takuya; and Kikuchi, Mikio, to Kayaku Antibiotic Research Co., Ltd. Antibiotic TS-0822. 4,016,256, Cl. 424-121.000.
Ishida, Yaichi; Ikeda, Hiroshi; and Hiraishi, Shigetoshi, to Mitsubishi Paper Mills, Ltd. Color photographic lightsensitive material. 4,015,990, Cl. 96-84.0UV.

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Ishikawa, Masakazu; Ito, Sadayoshi; Oka, Hiroyuki; Iida, Kennoske; Usui, Kenji; and Asaba, Masayoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Device for warning of excessive wear on a brake lining. 4,016,533, Cl. 340-52.00A.
Isodyne Inc.: *See—*
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Ito, Ryuji; and Komatsu, Mitsuaki, to Kabushiki Kaisha Komatsu Seisakusho. Control system for power train and auxiliary equipment driven from a common prime mover. 4,015,482, Cl. 74-15.840.
Ito, Sadayoshi: *See—*
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Itoh, Hirokazu, to First-Sha Co., Ltd. Method for treating printed paper sheets for illuminated display. 4,016,309, Cl. 427-161.000.
Itoh, Kunio; and Inoue, Morio, to Matsushita Electronics Corporation. Double heterostructure semiconductor laser. 4,016,505, Cl. 331-94.50H.
Itoh, Masanori: *See—*
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Itoh, Takane, to Nissan Motor Co., Ltd. Gas turbine engine fuel control system. 4,015,425, Cl. 60-39.28T.
Itoh, Takuji: *See—*
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Iwasaki, Sadayoshi, to Alps Electric Co., Ltd. Slide switch assembly having improved fixed knife blade type contact structure. 4,016,377, Cl. 200-16.00F.
Iwata, Hiroshi; and Ishikawa, Katsuji, to West Electric Company, Ltd. Program-controlled shutter. 4,016,574, Cl. 354-29.000.
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Jackovitz, John F.; and Pantier, Earl A., to Westinghouse Electric Corporation. Method of preparing high capacity nickel electrode powder. 4,016,091, Cl. 252-182.100.
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Jade Corporation, The: *See—*
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Jaeggi, Knut A.; Ostermayer, Franz; and Schroter, Herbert, to Ciba-Geigy Corporation. Composition and method for treatment of heart and circulatory ailments. 4,016,283, Cl. 424-274.000.
Jaegtnes, Karl O.: *See—*
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Jaffe, Edward Ephraim, to Du Pont de Nemours, E. I., and Company. 2,9-Dichloroquinacridone pigment compositions. 4,015,998, Cl. 106-288.00Q.
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Jasinski, Leon; and Steel, Francis Robert, to Motorola, Inc. Switching amplifier system. 4,016,501, Cl. 330-10.000.
Jastrzebski, Andrzej. Collapsible multilevel building. 4,015,377, Cl. 52-66.000.
Jay, Ronald Frank, to Technicon Instruments Corporation. Sample supply apparatus and method for automatic analysis systems. 4,015,938, Cl. 23-230.00R.
Jayne, Gerald John Joseph; Askew, Herbert Frank; and Harrington, Colin John, to Castrol Limited. Hydraulic fluids. 4,016,088, Cl. 252-78.300.
Jean, Roger: *See—*
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Jeter, Sheldon M., to Milliken Research Corporation. Tufting needle. 4,015,551, Cl. 112-222.000.
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Johnsen, Kenneth E., to Dow Chemical Company, The. Process for sizing textile fibers for use on water jet looms. 4,015,317, Cl. 28-72.600.
Johnson, C. Evan, to Hitachi Magnetics Corporation. Fishing line release mechanism. 4,015,362, Cl. 43-43.110.
Johnson, Daniel W., to Amtex, Inc. Method of knitting a two-way non-run ventilated fabric. 4,015,444, Cl. 66-42.000.
Johnson, Harold K., to Bemis Company, Inc. Apparatus for inserting liners in bags. 4,015,515, Cl. 93-8.00W.
Johnson & Johnson: *See—*
Goff, Richard Everett, Jr.; Guay, Normand Daniel; and Priestley, Joseph Amos, 4,015,641.
Kalwaites, Frank, 4,016,317.
Millet, Marcus Jacob, 4,015,709.
Johnson, Larry A., to Westinghouse Electric Corporation. Turbine generator end-winding support apparatus. 4,016,443, Cl. 310-260.000.
Johnson, Ronald, to Lawrence Peska Associates, Inc. Elevator system safety brace device. 4,015,689, Cl. 187-62.000.
Johnson, Theodore W.: *See—*
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Johnson, W. Grant. Valve for an oral evacuator system. 4,015,336, Cl. 32-33.000.
Jonas, Rochus; Uhl, Jurgen; Muller-Calgan, Helmut; and Irmscher, Klaus, to Merck Patent Gesellschaft mit beschrankter Haftung. Tetralone and indanone compounds. 4,016,281, Cl. 424-267.000.
Jones, Robert N., to Xerox Corporation. Composite xerographic photoreceptor with injecting contact layer. 4,015,985, Cl. 96-1.500.
Jonsson, Arne Ingvar; Malmstrom, Olov Valdemar; and Tibell, Bengt Gunnar Julius, to Aktiebolaget Electrolux. Apparatus for washing sanitary conveniences such as bed pans and the like. 4,015,614, Cl. 134-152.000.
Jordan, Joseph L., to Dravo Corporation. Process for sludge disposal and circular landfill system. 4,016,073, Cl. 210-24.000.
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Joseph Lucas Limited: *See—*
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Junak, Edward M. Ignition system. 4,015,576, Cl. 123-148.00E.
Jung, Horst; Sassenroth, Karl-Wilhelm; and Ferenczy, Nikolaus, to Dr. Hesse & Cie. Spezialfabrik fur Galvanotechnik. Process for activating a non-conductive substrate and composition therefor. 4,015,992, Cl. 106-1.000.
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Kaeding, Warren W., to Mobil Oil Corporation. Disproportionation of toluene. 4,016,219, Cl. 260-672.00T.
Kaga, Sumihiro: *See—*
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Kagaya, Yutaka, to Silver Seiko Co., Ltd. Patterning system for a knitting machine. 4,015,446, Cl. 66-75.200.
Kahan, William; and Peer, Thomas Richard, to Singer Company, The. Automated home knitting machine with means for controlling the knitting of design rows. 4,015,445, Cl. 66-75.200.
Kaikkonen, Antero: *See—*
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Kali-Chemie Pharma GmbH: *See—*
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Kanezuka, Tadao, to Hitachi, Ltd. MIS logical circuit. 4,016,430, Cl. 307-205.000.
Kankaanpaa, Matti, to Valmet Oy. Suction roll for transferring a web away from a press section. 4,016,032, Cl. 162-305.000.
Kanner, Bernard; and Prokai, Bela, to Union Carbide Corporation. Morpholino-bearing polyalkylsiloxanes. 4,016,163, Cl. 260-247.70L.
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Karasaki, Tadashi; Hayashi, Chikako; and Furuichi, Etsuko, to Toyama Chemical Co., Ltd. Novel polypeptide produced by pseudomonas. 4,016,260, Cl. 424-177.000.
Kariyone, Kazuo; Yagi, Hideo; and Yoshida, Kazuhiko, to Fujisawa Pharmaceutical Co., Ltd. Process for the optical resolution of DL-2-(4-hydroxyphenyl)glycine. 4,016,205, Cl. 260-519.000.
Karlsson, Lars-Erik, to Nilcon Engineering AB. Machine to arrange a noise insulation between two concrete elements. 4,016,024, Cl. 156-378.000.
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Kelf, Michael A., to United States of America, Navy. Stable platform shipping container. 4,015,715, Cl. 206-521.000.
Keller, Alfred. Protecting system for roadway adjacent areas. 4,015,682, Cl. 181-33.00E.
Keller, Edwin, to Gretag Aktiengesellschaft. Sheet material transport system. 4,015,703, Cl. 198-624.000.
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Kessler, Gerald. Double-insulated glass window with insulating spacer. 4,015,394, Cl. 52-616.000.
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Kibler, Kenneth G.; and Carter, Harris G., Jr., to United States of America, Air Force. Apparatus for electric enhancement of heat transfer. 4,015,658, Cl. 165-96.000.
Kikuchi, Masanori: *See—*
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Kim, Dongsung Robert, to Burroughs Corporation. Longitudinal parity generator for use with a memory. 4,016,409, Cl. 235-153.0AM.
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Kinney, Alfred W., to Phillips Petroleum Company. Production of a variegated product. 4,015,644, Cl. 141-9.000.
Kinnison, Daniel E. Digger attachment. 4,015,672, Cl. 173-160.000.

Kinsell, Robert C.; Noe, James C.; and Byrne, John P., to Garrett Corporation, The. Air cycle air conditioning system for vehicles. 4,015,438, Cl. 62-88.000.
Kintanar, Jane, to Lawrence Peska Associates, Inc., a part interest. Cosmetic gloves. 4,016,027, Cl. 2-159.000.
Kiplinger, Dale V.: *See—*
Beatty, Ronald L.; Kiplinger, Dale V.; and Chilcoat, Bill R., 4,016,304.
Kirn, Thomas G., to Eastman Kodak Company. Carrier for mounting pairs of magnetic heads to a drum-type tape scanning unit. 4,016,600, Cl. 360-109.000.
Kisor, Thaddeus William, to RCA Corporation. Carrier for semiconductor components. 4,015,707, Cl. 206-328.000.
Kistler Instrumente AG: *See—*
Calderara, Reto; Baumgartner, Hans U.; Tichy, Jan; and Sonderegger, Hans C., 4,016,437.
Kitai, Kiyoshi; Ogihara, Masuo; Sato, Kouzo; and Shinozaki, Nobuo, to Seiko Koki Kabushiki Kaisha. Alarm time setting notifying mechanism for a clock or the like. 4,015,417, Cl. 58-22.700.
Kitame, Fumio: *See—*
Ishida, Nakao; Kitame, Fumio; Utsushikawa, Kuniko; Kohama, Tomoaki; Saito, Takuya; and Kikuchi, Mikio, 4,016,256.
Kiuchi, Mitsuyuki; and Mizukawa, Takumi, to Matsushita Electric Industrial Co., Ltd. Induction heating apparatus with means for improving the dv/dt capability of a silicon-controlled rectifier used therein. 4,016,391, Cl. 219-10.490.
Kiuchi, Mitsuyuki: *See—*
Amagami, Keizo; Kobayashi, Takao; Ogino, Yoshio; and Kiuchi, Mitsuyuki, 4,016,390.
Klauminzer, Gary K., to Molectron Corporation. Optical beam expander for dye laser. 4,016,504, Cl. 331-94.50C.
Klein, Paul R.: *See—*
Horrocks, Donald L.; and Klein, Paul R., 4,016,418.
Kleuters, Wilhelm Josef; and Gieles, Antonius Cornelis Maria, to U.S. Philips Corporation. Mass flowmeter for a gaseous medium, for example air. 4,015,473, Cl. 73-205.00L.
Klier, Heiner: *See—*
Ganter-Ullmann, Karl; Neussel, Paul; Abermeth, Hubert; Wahnschaffe, Jurgen; and Klier, Heiner, 4,015,485.
Klitz, Ronald J., to J. I. Case Company. Drive range and lock control system. 4,015,679, Cl. 180-66.00R.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Ganter-Ullmann, Karl; Neussel, Paul; Abermeth, Hubert; Wahnschaffe, Jurgen; and Klier, Heiner, 4,015,485.
Klomp, Gregory F.: *See—*
Browning, Scott M.; and Klomp, Gregory F., 4,016,414.
Klosa, Josef: *See—*
Menge, Heinz Gunter; and Klosa, Josef, 4,016,280.
Knabe, Bernd: *See—*
Bormann, Dieter; Knabe, Bernd; Schrinner, Elmar; and Worm, Manfred, 4,016,159.
Knapp, Charles A., to United States of America, Army. Illuminative and incendiary explosive munitions. 4,015,529, Cl. 102-66.000.
Knapp, Kurt: *See—*
Kunze, Lutz; Knapp, Kurt; and Brammer, Klaus, 4,015,338.
Knifton, John F.; and Suggitt, Robert M., to Texaco Inc. Preparative process for preparing phenylenediacetate diesters. 4,016,194, Cl. 260-475.0SC.
Knoblauch, Karl: *See—*
Munzner, Heinrich; Heimbach, Heinrich; Korbacher, Werner; Peters, Werner; Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, 4,015,956.
Knogo Corporation: *See—*
Novikoff, Eugene B.; and Pruzick, Ronald, 4,016,553.
Knohl, Herbert, to Colgate-Palmolive Company. Support stocking. 4,015,448, Cl. 66-185.000.
Knorr-Bremse GmbH: *See—*
Pollinger, Hans; Prahl, Franz; and Schorwerth, Mathias, 4,015,691.
Kobayakawa, Toshihiro; Yasuda, Hiroshi; Goto, Kazuhiro; and Nakanishi, Michio, to Yoshitomi Pharmaceutical Industries, Ltd. Treatment of liver dysfunction with 2-amino-6-benzyl-3-ethoxycarbonyl-4,5,6,7-tetrahydro-thieno[2,3-c]pyridine hydrochloride. 4,016,276, Cl. 424-256.000.
Kobayashi, Ikuya; Arai, Hiroshi; Ohta, Jun; and Izawa, Minoru, to Toyota Jidosha Kogyo Kabushiki Kaisha. Indicator device for automobiles. 4,016,534, Cl. 340-52.00F.
Kobayashi, Juichi: *See—*
Miyagawa, Norio; Sato, Mitsuo; Kobayashi, Juichi; and Kobayashi, Takashi, 4,016,306.
Kobayashi, Takao; Amagami, Keizo; Mizukawa, Takumi; and Toyooka, Tadao, to Matsushita Electric Industrial Co., Ltd. Pan detector for induction heating apparatus. 4,016,392, Cl. 219-10.490.
Kobayashi, Takao: *See—*
Amagami, Keizo; Kobayashi, Takao; Ogino, Yoshio; and Kiuchi, Mitsuyuki, 4,016,390.
Kobayashi, Takashi: *See—*
Miyagawa, Norio; Sato, Mitsuo; Kobayashi, Juichi; and Kobayashi, Takashi, 4,016,306.
Kobayashi, Toshihiko; Hiranuma, Hidetoshi; Mizogami, Susumu; Nishi, Hiroyoshi; Higuchi, Mamoru; and Onoya, Masatoshi, to Mitsubishi Yuka Pharmaceutical Co., Ltd. Novel substituted phenylacetic acid derivatives and a process for preparing thereof. 4,016,193, Cl. 260-471.00R.
Kobayashi, Toshio: *See—*
Susa, Kenzo; Kobayashi, Toshio; Taniguchi, Satoshi; and Ishii, Mitsuru, 4,016,244.
Kobe Steel Ltd.: *See—*
Ikegami, Yoshio; Kimura, Hirohumi; and Kohge, Tadashi, 4,015,785.
Kobori, Takenobu, to Kabushiki Kaisha Daini Seikosha. Electronic timepiece having plural capacitors for selectively adjusting quartz crystal oscillator output frequency. 4,016,508, Cl. 331-116.00R.
Koch, Bernhard R., to Grob & Co. Aktiengesellschaft. Heddle frame with laterally displaced lateral supports. 4,015,639, Cl. 139-92.000.
Koch, Richard C.; and Richards, Hugh C., to Pfizer Inc. Pesticidal carbamates. 4,016,278, Cl. 424-263.000.
Kochhar, Rajindar K.; and Rowatt, Robert J., to Gulf Research & Development Company. Olefin polymerization catalyst. 4,016,344, Cl. 526-124.000.
Koehring Company: *See—*
Kruder, George A., 4,015,832.
Koella, Ernest, III, to Platt Saco Lowell Limited. Trash collecting system for open-end spinning machine. 4,016,004, Cl. 134-21.000.
Koerbel, Claus E.; and McIntyre, Kenneth M., to Lunar Industries, Inc. Door valet. 4,015,871, Cl. 294-19.00R.
Koetzle, Gunther W., to International Business Machines Corporation. Method and arrangement for supervising power supply systems. 4,016,408, Cl. 235-153.00A.
Kofink, Siegfried, to J. Eberspacher. Electromagnetic pumping device for liquids. 4,015,912, Cl. 417-417.000.
Kofol, J. Stephen, to Honeywell Inc. Dielectric waveguide oscillator. 4,016,506, Cl. 331-96.000.
Koft, Emil, Jr., to Mobil Oil Corporation. Metal alkylphenate sulfides of reduced corrosiveness and method of preparing same. 4,016,093, Cl. 252-42.700.
Kogure, Katsura; Sueda, Noriyoshi; Himoto, Sizuo; Yoshino, Youziro; and Nakagawa, Kunio, to Nisshin Flour Milling Co., Ltd. Butenoic and pyruvic acid derivatives. 4,016,196, Cl. 260-476.00R.
Kohama, Tomoaki: *See—*
Ishida, Nakao; Kitame, Fumio; Utsushikawa, Kuniko; Kohama, Tomoaki; Saito, Takuya; and Kikuchi, Mikio, 4,016,256.
Kohge, Tadashi: *See—*
Ikegami, Yoshio; Kimura, Hirohumi; and Kohge, Tadashi, 4,015,785.
Kohner, Inc.: *See—*
Stubbmann, Albert, 4,015,365.
Koike, Junichi: *See—*
Sakaguchi, Yasuhiro; Koike, Junichi; and Kubo, Takehisa, 4,016,083.
Kokko, Gerald. Spare tire locking mechanism. 4,015,761, Cl. 224-42.240.
Kolesinski, Henry S.; Mehta, Avinash C.; and Taylor, Lloyd D., to Polaroid Corporation. Hydroxyl-containing polymers having aminimide groups attached thereto through an ether linkage. 4,016,340, Cl. 526-7.000.
Kolesnikov, Arkady Georgievich: *See—*
Barannik, Valery Pavlovich; and Kolesnikov, Arkady Georgievich, 4,015,971.
Koller, Stefan; Lapple, Arnulf Ruediger; and Pacher, Marielise, to Ciba-Geigy Corporation. Process for dyeing blended fabrics. 4,015,933, Cl. 8-21.00A.
Kolomiitsev, Mikhail Alexandrovich: *See—*
Ambardanishvili, Tristan Silovanovich; Dundua, Vakhtang Justinovich; and Kolomiitsev, Mikhail Alexandrovich, 4,016,095.
Komatsu, Mitsuaki: *See—*
Ito, Ryuji; and Komatsu, Mitsuaki, 4,015,482.
Komatsu, Toshiyoshi, to Duskin Franchise Co., Ltd. Mop holder. 4,015,305, Cl. 15-150.000.
Kommanditbolaget Pemac Invention AB & Co.: *See—*
Wadensten, Carl Tommy, 4,015,712.
Kondo, Kiyosi; Terada, Osamu; Oshima, Kohei; Mori, Yasuki; and Mochida, Kenichi, to Kyowa Hakko Kogyo Co., Ltd.; and Sagami Chemical Research Center, part interest to each. β-Phenoxy or substituted phenoxy ethanol compounds. 4,016,186, Cl. 260-473.00R.
Kondratiev, Vasily Ivanovich: *See—*
Budker, Gersh Itskovich; Gaponov, Vasily Alexandrovich; Korabelnikov, Boris Mikhailovich; Krainov, Gennady Sergeevich; Kuznetsov, Sergei Alexandrovich; Kuksanov, Nikolai Konstantinovich; Kondratiev, Vasily Ivanovich; and Salimov, Rustam Abelevich, 4,016,499.
Kondur, Nicholas, Jr., to Burroughs Corporation. Alphanumeric serial printer with a flexible membrane printing element. 4,015,699, Cl. 197-57.000.
Kongelka, Robert M., to Superior Valve Company. Safety yoke for high pressure gases. 4,015,865, Cl. 285-198.000.
Konig, Hans-Bodo; Schrock, Wilfried; Disselnkotter, Hans; and Metzer, Karl Georg, to Bayer Aktiengesellschaft. Ureidoacetamidopenicillins. 4,016,282, Cl. 424-271.000.
Koninklijke Emballage Industrie Van Leer B.V.: *See—*
Wolff, Per Lind; and Gent, John Arthur Gooch, 4,016,111.
Konishi, Nobutake; Yatsuo, Tsutomu; Kamei, Tatsuya; Okamura, Masahiro; and Ogawa, Takuzo, to Hitachi, Ltd. Bidirectional photothyristor device. 4,016,593, Cl. 357-38.000.
Konishi, Nobutake: *See—*
Yatsuo, Tsutomu; and Konishi, Nobutake, 4,016,592.
Konno, Mitsutaka: *See—*
Horiye, Masakazu; Sasaki, Kenichi; and Konno, Mitsutaka, 4,015,568.
Konoma, Kunihiko; and Satou, Kaname, to Minolta Camera Kabushiki Kaisha. Four element lens system. 4,015,897, Cl. 350-209.000.
Konstruktiewerkhuizen, DeMets N.V.: *See—*
De Mets, Albert, 4,015,921.

Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, to Boehringer Ingelheim GmbH. 1-Phenoxy-2-hydroxy-3-alkynylamino-propanes and salts thereof. 4,016,202, Cl. 260-501.170.

Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, to Boehringer Ingelheim GmbH. Pharmaceutical compositions containing a 1-phenoxy-2-hydroxy-3-alkynylamino-propane and their use as adrenolytics and hypotensives. 4,016,286, Cl. 424-304.000.

Koppers Company, Inc.: *See—*
Van Ackeren, Joseph, 4,016,045.
Van Ackeren, Joseph; and Tucker, Linwood G., 4,016,046.

Korabelnikov, Boris Mikhailovich: *See—*
Budker, Gersh Itskovich; Gaponov, Vasily Alexandrovich; Korabelnikov, Boris Mikhailovich; Krainov, Gennady Sergeevich; Kuznetsov, Sergei Alexandrovich; Kuksanov, Nikolai Konstantinovich; Kondratiev, Vasily Ivanovich; and Salimov, Rustam Abelevich, 4,016,499.

Korbacher, Werner: *See—*
Munzner, Heinrich; Heimbach, Heinrich; Korbacher, Werner; Peters, Werner; Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, 4,015,956.

Korkut, Mehmet D. Semi-submersible drill barge. 4,015,552, Cl. 114-265.000.

Kormany, Geza: *See—*
Weber, Kurt; and Kormany, Geza, 4,016,156.

Kosiancic, Eugene Joseph, to Babcock & Wilcox Company, The. Method of making porous nuclear fuel. 4,016,226, Cl. 264-.500.

Koski, John Alexander; Lissner, Rudolf Werner; and Roberts, Spencer Donald, to International Business Machines Corporation. Adaptive reel-to-reel tape control system. 4,015,799, Cl. 242-203.000.

Koss, Dieter G.: *See—*
MacFarlane, Walter J.; and Koss, Dieter G., 4,015,310.

Kossak, Joseph J., to Oxy-Dry Sprayer Corporation. Apparatus for cleaning rotating cylindrical surfaces. 4,015,307, Cl. 15-256.520.

Kostrzewa, Michael: *See—*
Holst, Arno; Kostrzewa, Michael; and Lask, Helmut, 4,015,611.

Kotani, Haruo; Hirata, Haruyoshi; and Hosokawa, Yoshinori, to Horiba, Ltd. Non-dispersive X-ray fluorescence analyzer. 4,016,419, Cl. 250-272.000.

Kotzsch, Hans-Joachim; and Vahlensieck, Hans-Joachim, to Dynamit Nobel Aktiengesellschaft. Process for the preparation of low silanes and silane esters. 4,016,188, Cl. 260-448.80R.

Kouvoussis, Anthony E.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,016,546.

Koyanagi, Mitsumasa: *See—*
Wada, Yasuo; Usui, Hiroo; Koyanagi, Mitsumasa; and Ashikawa, Mikio, 4,016,007.

Kraft, Maxim Yakovlevich: *See—*
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.

Kraftwerk Union Aktiengesellschaft: *See—*
Eggemann, Willi; and Weghaupt, Erich, 4,016,442.

Krainov, Gennady Sergeevich: *See—*
Budker, Gersh Itskovich; Gaponov, Vasily Alexandrovich; Korabelnikov, Boris Mikhailovich; Krainov, Gennady Sergeevich; Kuznetsov, Sergei Alexandrovich; Kuksanov, Nikolai Konstantinovich; Kondratiev, Vasily Ivanovich; and Salimov, Rustam Abelevich, 4,016,499.

Kreitz, Hans, to Fa. H. Krantz. Interrupting the rotary movement of a guide roller. 4,015,452, Cl. 68-175.000.

Krekler, Marion M. Tab puller and slide fastener protector. 4,015,312, Cl. 24-205.15H.

Krohn, David A.: *See—*
Deeg, Emil W.; and Krohn, David A., 4,015,965.

Krone, Hartmut: *See—*
Schiessl, Alois; and Krone, Hartmut, 4,015,355.

Kronewitter, Michael R.: *See—*
McCune, Harold K.; and Kronewitter, Michael R., 4,016,405.

Kroposki, Lorraine M.; and Yoshimine, Masao, to Dow Chemical Company, The. Process for preparing phosphorothioates and phenylphosphonothioates. 4,016,225, Cl. 260-973.000.

Kroy Industries Inc.: *See—*
Paque, Michael W., 4,015,700.

Kruder, George A., to Koehring Company. Extruder screws. 4,015,832, Cl. 259-191.000.

Krueger, Earl R.: *See—*
Rajadhyaksha, Vithal J.; Schroer, Richard A.; Brock, Phillip J.; and Krueger, Earl R., 4,016,223.

Krueger, James Elwood: *See—*
Sieger, George Madison; Krueger, James Elwood; Osterberg, Arnold Curtis; and Tedeschi, David Henry, 4,016,273.

Kubiak, Herbert: *See—*
Hecht, Meinhard; and Kubiak, Herbert, 4,016,394.

Kubo, Takehisa: *See—*
Sakaguchi, Yasuhiro; Koike, Junichi; and Kubo, Takehisa, 4,016,083.

Kudo, Teizo; Hashizume, Yoshio; Itoh, Masanori; and Shiga, Makoto, to Daicel Ltd. Impact-resistant resin composition. 4,016,221, Cl. 260-873.

Kufrin, Frederick W.: *See—*
Stenzel, Wallace I.; Kufrin, Frederick W.; and Allen, Donald J., 4,015,953.

Kuksanov, Nikolai Konstantinovich: *See—*
Budker, Gersh Itskovich; Gaponov, Vasily Alexandrovich; Korabelnikov, Boris Mikhailovich; Krainov, Gennady Sergeevich; Kuznetsov, Sergei Alexandrovich; Kuksanov, Nikolai Konstantinovich; Kondratiev, Vasily Ivanovich; and Salimov, Rustam Abelevich, 4,016,499.

Kumazawa, Kikuo, to Hiryokagaku Kenkyusho. Method for determination of total nitrogen and heavy nitrogen content. 4,015,936, Cl. 23-230.0PC.

Kummer, Werner: *See—*
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, 4,016,202.
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, 4,016,286.

Kunze, Lutz; Knapp, Kurt; and Brammer, Klaus, to Daimler-Benz Aktiengesellschaft. Method and apparatus for control measurement of a motor vehicle frame and or aggregates connected thereto. 4,015,338, Cl. 33-228.000.

Kupper, Friedrich-Wilhelm; and Streck, Roland, to Chemische Werke Huels Aktiengesellschaft. Process for the preparation of 9-tricosene and 9-heneicosene. 4,016,220, Cl. 260-683.00D.

Kuptsova, Alla Ivanovna: *See—*
Rogova, Svetlana Tanovna; Pikunov, Mikhail Vladimirovich; Kuptsova, Alla Ivanovna; Obukhova, Galina Zakharovna; Karalnik, Dmitry Mikhailovich; and Rybakov, Anatoly Ivanovich, 4,015,981.

Kurata, Hirotaka, to Sansui Electric Co., Ltd. Compatible stereophonic receiver. 4,016,366, Cl. 179-15.0BT.

Kurata, Motoji, to Japan Medical Supply Co., Ltd. Test tube assembly. 4,015,941, Cl. 23-259.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Otani, Sugio; Watanabe, Shoji; and Araki, Tadashi, 4,016,247.
Takahashi, Masaaki; Ito, Akira; Kawawata, Shichiro; and Ogura, Jiro, 4,016,135.

Kurimoto, Kazuhiko: *See—*
Ogawa, Kinya; Kurimoto, Kazuhiko; Eguchi, Yoshitsugu; and Kuwata, Satoshi, 4,016,341.

Kurimoto, Masashi: *See—*
Sugimoto, Kaname; Hirao, Mamoru; Kurimoto, Masashi; and Miyake, Eikichi, 4,016,038.

Kuroishi, Kenjiro: *See—*
Otsuki, Shoji; Kuroishi, Kenjiro; and Ohara, Eiji, 4,015,415.

Kurokawa, Masayuki, to Nittetsu Curtainwall Corporation, a part interest. Shelf assembly. 4,015,545, Cl. 108-107.000.

Kurtz, Leonard D.; and Bidwell, Robert E., to Deknatel Inc. Surgical drainage system with pressure indicator. 4,015,603, Cl. 128-276.000.

Kurumada, Tomoyuki: *See—*
Murayama, Keisuke; Morimura, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohta, Noriyuki; and Osawa, Hisayou, 4,016,168.

Kushner, Jack; and Zwirblis, Henry G., to Delta Scientific Corporation. Metering pump wherein tubular pump is responsive to force impulses. 4,015,914, Cl. 417-478.000.

Kusunose, Tetsuhiro: *See—*
Matsuyama, Mitsuyoshi; and Kusunose, Tetsuhiro, 4,016,329.

Kuwata, Satoshi: *See—*
Ogawa, Kinya; Kurimoto, Kazuhiko; Eguchi, Yoshitsugu; and Kuwata, Satoshi, 4,016,341.

Kuznetsov, Sergei Alexandrovich: *See—*
Budker, Gersh Itskovich; Gaponov, Vasily Alexandrovich; Korabelnikov, Boris Mikhailovich; Krainov, Gennady Sergeevich; Kuznetsov, Sergei Alexandrovich; Kuksanov, Nikolai Konstantinovich; Kondratiev, Vasily Ivanovich; and Salimov, Rustam Abelevich, 4,016,499.

Kuznetsova, Alexandra Moiseevna: *See—*
Miller, Viktor Yakovlevich; Kandakov, Gennady Petrovich; and Kuznetsova, Alexandra Moiseevna, 4,015,547.

Kuzuba, Noboru: *See—*
Hyosu, Yoshihiko; Miyashita, Eiiti; Kuzuba, Noboru; Miyahara, Sadayasu; and Takano, Ryoshiro, 4,016,133.

Kwok, Clyde C. K., to Rippingille, E. V., Jr. Fluid oscillator and pulsating shower head employing same. 4,015,779, Cl. 239-102.000.

Kyowa Hakko Kogyo Co., Ltd.: *See—*
Kondo, Kiyosi; Terada, Osamu; Oshima, Kohei; Mori, Yasuki; and Mochida, Kenichi, 4,016,186.

L.C.C.-C.I.C.E.-Compagnie Europeenne de Composants Electroniques: *See—*
Frappart, Pierre, 4,016,466.

L. & C. Steinmuller GmbH: *See—*
Albrecht, Wolfgang; and Dorling, Rolf, 4,015,742.

La Soudure Electrique Autogene, Procedes Arcos: *See—*
De Haeck, Robert, 4,016,399.

Lace, Melvin A.; and Pelletier, Fernand F., to Motorola, Inc. Reversible cartridge tape player system with side drive. 4,015,789, Cl. 242-55.19R.

La Chapelle, Leo, to Rembert, Frank; and La Chapelle, Leo, part interest to each. Speed warning device. 4,016,536, Cl. 340-62.000.

Lacroix, Bernard: *See—*
Pompei, Jean; Lacroix, Bernard; and Pierrot, Francis, 4,016,524.

La Fleur, Lee. Heat sealing unit and method of making same. 4,016,021, Cl. 156-154.000.

Laftsidis, Stergios: *See—*
Glabe, Elmer F.; Anderson, Perry W.; and Laftsidis, Stergios, 4,016,294.

Laganis, Deno, to Schenectady Chemicals, Inc. Water-soluble wire enamel. 4,016,330, Cl. 428-379.000.

Laidig, Jonathan J., to Laidig Silo Unloaders, Inc. Sweep auger for bottom silo unloaders. 4,015,734, Cl. 214-17.0DA.

Laidig Silo Unloaders, Inc.: *See*—
Laidig, Jonathan J., 4,015,734.

Laing, Nikolaus. Device for receiving or emitting radiation energy. 4,015,583, Cl. 126-270.000.

Lalumiere, Edward J.: *See*—
Arzberger, William A.; and Lalumiere, Edward J., 4,015,749.

Lambert, Robert Wilson: *See*—
Atherton, Frank Ratcliffe; Hall, Michael John; Hassall, Cedric Herbert; Ringrose, Peter Stuart; and Lambert, Robert Wilson, 4,016,148.

Lamm, Gunther: *See*—
Dehnert, Johannes; and Lamm, Gunther, 4,016,152.

Lancaster, Woodrow A.; Jebb, William T.; and Chagan, Alan M. Diving suit and neck seal therefor. 4,015,295, Cl. 2-2.10R.

Lang, Walter W.; and Shimp, Alan B., to Westinghouse Electric Corporation. Circuit breaker with improved single coil actuator and undervoltage release mechanism. 4,016,518, Cl. 335-7.000.

Lange, Karl Heinz, to Balda-Werke. Shutter drive synchronously set with film frame and flash c[illegible]e set. 4,016,581, Cl. 354-144.000.

Langen, Marinus J. M., to H. J. Langen & Sons Ltd. Wrap-around carton forming machine. 4,015,403, Cl. 53-195.000.

Langguth, Arthur F., to United States of America, Navy. Retriever. 4,015,873, Cl. 294-66.00R.

LaNieve, Herman L., to Celanese Corporation. Spinning apparatus providing for essentially constant extensional strain rate. 4,015,924, Cl. 425-455.00F.

Lanni, Michael J.; and Calamera, John, to Bendix Corporation, The. Sensor including means for operating the sensor in rate measuring and stabilization modes. 4,016,469, Cl. 318-590.000.

Laoteppitaks, Chansak; Henthorn, Lincoln; and Falconer, Charles B., to Chestel, Inc. Digital tone decoder. 4,016,370, Cl. 179-84.0VF.

Laporte Industries Limited: *See*—
Whittam, Thomas Vincent, 4,016,246.

Lapple, Arnulf Ruediger: *See*—
Koller, Stefan; Lapple, Arnulf Ruediger; and Pacher, Marielise, 4,015,933.

Laptewicz, Joseph E., Jr.: *See*—
Finn, Robert K.; Tannahill, Alex L.; and Laptewicz, Joseph E., Jr., 4,016,085.

Larsson, Bjorn E.; and Le Sota, Stanley, to Rohm and Haas Company. Emulsion copolymers of acrolein and their use in treating leather. 4,016,127, Cl. 260-29.6TA.

Laser Industries, Ltd.: *See*—
Sharon, Uzi, 4,015,906.

Lasher, Jordan S.: *See*—
Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,016,069.
Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,016,070.

Lask, Helmut: *See*—
Holst, Arno; Kostrzewa, Michael; and Lask, Helmut, 4,015,611.

Lauck, Helmut, to Varta Batterie Aktiengesellschaft. Galvanic element. 4,016,338, Cl. 429-149.000.

Laurent, Henry: *See*—
Hofmeister, Helmut; Annen, Klaus; Wiechert, Rudolf; and Laurent, Henry, 4,016,269.

Laurus, Felix F.: *See*—
Butts, Ernest Otto; and Laurus, Felix F., 4,015,396.

Lauzier, Rene. Adjustable mounting assembly for railing. 4,015,826, Cl. 256-59.000.

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Lawrence Peska Associates, Inc.: *See*—
Johnson, Ronald, 4,015,689.
Kintanar, Jane, 4,016,027.
McCarthy, Peter, 4,015,327.
Rogers, William F., 4,015,608.
Sedlak, Joseph, 4,015,363.

Laxo, Darryl E., to United States of America, Navy. Pressure control and fluid venting system for a pressurized container. 4,015,621, Cl. 137-173.000.

Lazzari, Jean-Pierre, to Compagnie Internationale pour l'Informatique. Integrated magnetic head having pole-pieces of a reduced frontal width. 4,016,601, Cl. 360-122.000.

Leca Trading & Concession A/S: *See*—
Kamstrup-Larsen, Harry, 4,015,929.

Lechner, Uwe: *See*—
Wetzel, Bernd; Woitun, Eberhard; Maier, Roland; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,016,263.

Lectrofood, Inc.: *See*—
Theimer, Ernst Theodore; and Heinze, George E., 4,016,297.
Theimer, Ernst Theodore; and Heinze, George E., 4,016,301.

Lee, James W.: *See*—
Webb, Harry B.; Lee, James W.; and Blair, Robert B., 4,015,538.

Lee, Yuan Ho. Cut-off stock feeding device for an automatic high speed cold nut former. 4,015,301, Cl. 10-76.00T.

Leeds & Northrup Italiana S.p.A.: *See*—
Meyer, Emilio G., 4,016,423.

Leenhouts, Albert C., to Superior Electric Company, The. Non-linear velocity change circuit for consecutive length commanded digital motor means. 4,016,472, Cl. 318-696.000.

Lees, Gerard, to Imperial Chemical Industries Limited. Coloration of polyolefine articles. 4,016,132, Cl. 260-40.00R.

Lefeuvre, Andre: *See*—
Stcherbatcheff, Georges; and Lefeuvre, Andre, 4,015,870.

Lefeuvre, Antoine Augustin Joseph, to Societe d'Etudes et de Realisations Industrielles. Processing of emulsions. 4,016,076, Cl. 210-61.000.

Legatti, Raymond H.: *See*—
Draper, Charles W.; and Legatti, Raymond H., 4,015,888.

Leimgruber, Willy; and Valentine, Donald Herman, Jr., to Hoffmann-La Roche Inc. Process for the preparation of aldehydes. 4,016,212, Cl. 260-614.00R.

Leisner, Ernst; Ulbricht, Wolfgang; and Kaufmann, Helmut, to Robert Bosch G.m.b.H. Contamination-resistant valve for high-temperature, high-pressure applications. 4,015,815, Cl. 251-191.000.

Lemkin, Jack L.: *See*—
Clipson, Stuart A.; and Lemkin, Jack L., 4,015,713.

Lenotre, Michel Pierre Alphonse, to Etat Francais. Method of preparing priming explosives. 4,016,018, Cl. 149-17.000.

Lenz, Leonard L., to American Mobile Corporation. Apparatus for aligning a mobile lift work platform. 4,015,685, Cl. 182-145.000.

Leonard Gould & Company Limited: *See*—
Nichols, Cyril, 4,015,716.

L'Eplattenier, Francois: *See*—
Vuitel, Laurent; L'Eplattenier, Francois; and Pugin, Andre, 4,016,157.

Lerner, Edward; and Ventura, John A. Electromagnetically actuatable metering valve for successive delivery of measured volumes of fluid from a fluid reservoir. 4,015,755, Cl. 222-442.000.

Leroux, Marcel Henri: *See*—
Bishop, Everett Reece; and Leroux, Marcel Henri, 4,016,558.

LeRow, Charles E., Jr.; and Crookston, Ronald W., to Westinghouse Electric Corporation. Operating mechanism and position indicator for a circuit interrupter. 4,016,384, Cl. 200-148.00R.

Leschonski, Kurt; and Rumpf, Hans, to Leschonski, Kurt. Wet centrifugal separator for gas. 4,015,958, Cl. 55-235.000.

Lesh, Nathan George, deceased; by Merchants National Bank of Allentown, executor; Morabito, Joseph Michael; and Thomas, John Henry, III, to Bell Telephone Laboratories, Incorporated. Conduction system for thin film and hybrid integrated circuits. 4,016,050, Cl. 204-15.000.

Leshner, Ervin; and Leshner, Michael D., to Fuel Injection Development Corporation. Fuel metering and vaporizing system for internal combustion engines. 4,015,569, Cl. 123-133.000.

Leshner, Ervin; and Leshner, Michael D., to Fuel Injection Development Corporation. Charge forming system for internal combustion engines. 4,015,572, Cl. 123-139.0AW.

Leshner, Michael D.: *See*—
Leshner, Ervin; and Leshner, Michael D., 4,015,569.
Leshner, Ervin; and Leshner, Michael D., 4,015,572.

Le Sota, Stanley: *See*—
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Leurs, Gerardus Cornelis; Bosma, Rumoldus Matthijs Marinos Johannes; and Pouw, Theodorus Johannes Antonius, to Hoechst Aktiengesellschaft. Dosing device with pneumatic discharge for flowable solids. 4,015,754, Cl. 222-194.000.

Levecque, Marcel; Battigelli, Jean A.; and Plantard, Dominique, to Saint-Gobain Industries. Method and apparatus for forming fibers by toration. 4,015,963, Cl. 65-5.000.

Levecque, Marcel; Battigelli, Jean A.; and Plantard, Dominique, to Saint-Gobain Industries. Method and apparatus for making fibers from thermoplastic materials. 4,015,964, Cl. 65-5.000.

Lever Brothers Company: *See*—
Kattenberg, Hans Robert; and Poot, Cornelis, 4,016,302.
van Kampen, Daniel Marten, 4,016,041.

Leverton, Peter, to Nu-Line Products (Engineering) Limited. Locking unit for immobilizing vehicles. 4,015,455, Cl. 70-19.000.

Levi Strauss & Co.: *See*—
Hakanson, Karin, 4,015,318.

Levine, Walter E., to Bindicator Company. Method for manufacturing an ultrasonic transducer. 4,015,319, Cl. 29-25.350.

Lewandowski, Raymond F.: *See*—
Golbeck, Bernard J.; Lewandowski, Raymond F.; and Markinson, William C., 4,016,388.

Lewey, Sonia: *See*—
Mason, George W.; and Lewey, Sonia, 4,016,237.

Lewin, Nathan; and Mangiardi, Vito J., to Bio-Rad Laboratories, Inc. Competitive binding thyroid assay with improved bound-free separation step. 4,015,939, Cl. 23-230.00B.

Lewis, Harry R., Jr., to Standard Oil Company (Indiana). Subsea oil and gas production manifold system. 4,015,660, Cl. 166-.500.

Lewis, John A., Jr., to Polaroid Corporation. Flash mounting means for camera with folding viewfinder. 4,016,579, Cl. 354-126.000.

Lewis Woolf Griptight Limited: *See*—
Hurst, Eric Kenneth, 4,015,740.

Liautaud, James P. Catheter needle assembly. 4,015,600, Cl. 128-214.00R.

Libbey-Owens-Ford Company: *See*—
Brown, Laurence A.; Hagedorn, Floyd T.; and Waltz, Foster V., Jr., 4,015,969.
Revells, Robert G.; Olson, Earl J.; and Sutton, Charles W., 4,015,968.

Lichti, Robert D. Centrifugal braking device. 4,015,696, Cl. 188-189.000.

Lieb, Nathaniel H.; Kerfoot, Franklin W., Jr.; and Wallace, Richard A., to Star Dental Manufacturing Co., Inc. Dental handpiece and wrench therefor. 4,015,489, Cl. 81-55.000.
Liechti, Hans Wilhelm; and Markert, Jurgen, to Ciba-Geigy Corporation. Process for the dyeing of synthetic textile material. 4,015,934, Cl. 8-41.00C.
Lieser, Karl, to Hermann Werner, a Kommanditgesellschaft. Machine for grinding of peripheral surfaces on work pieces. 4,015,370, Cl. 51-90.000.
Lin Offshore Engineering, Inc.: *See*—
Chow, Philip Y., 4,015,554.
Lindsay, Fredrick H. Floor frame assembly for a mobile building. 4,015,375, Cl. 52-143.000.
Lines, Gregory L.; and Odinak, Alec, to Upjohn Company, The. Process for the isolation of polyimides in a solid state. 4,016,227, Cl. 264-14.000.
Lipha, Lyonnaise Industrielle Pharmaceutique: *See*—
Boschetti, Eugene; Briet, Philippe; Berthelon, Jean-Jacques; and Chabert, Janine, 4,016,285.
Lipovski, G. Jack, to Harris Corporation. Plural memory controller apparatus. 4,016,545, Cl. 340-172.500.
Liquid Crystal Products, Inc.: *See*—
Suzuki, Fred K.; and Davison, Thomas W., 4,015,591.
Lissner, Rudolf Werner: *See*—
Koski, John Alexander; Lissner, Rudolf Werner; and Roberts, Spencer Donald, 4,015,799.
List, Ferdinand: *See*—
Wulf, Horst-Dieter; List, Ferdinand; Orlowski, Friedrich-August; Wilke, Norbert; and Pflegerl, Emmerich, 4,015,943.
Litton Business Telephone Systems, Inc.: *See*—
Hoehn, Steven Jon, 4,016,372.
Liu, Benjamin Y. H.; Jordan, Richard C.; and Willeke, Klaus, to University of Minnesota, The Regents of the. Solar heat collector. 4,015,582, Cl. 126-270.000.
Living Walls Inc.: *See*—
Carroll, John P., 4,015,808.
Lloyd, Wayne B., to Westinghouse Electric Corporation. Target sighting device. 4,015,905, Cl. 356-248.000.
Lo, Cheng Fan: *See*—
Hearon, William Montgomery; Witte, John F.; and Lo, Cheng Fan, 4,016,207.
Lodge, Guy Bryan. Fluid applicators. 4,015,907, Cl. 401-48.000.
Lodge, Fritz: *See*—
Forster, Hermann; Schluter, Wilhelm; and Sterr, Horst, 4,015,829.
Lodige, Wilhelm; Lodige, Fritz; and Lucke, Josef, 4,015,830.
Lodige, Wilhelm; Lodige, Fritz; and Lucke, Josef. Apparatus for applying glue to chips, fibers and the like. 4,015,830, Cl. 259-25.000.
Lodige, Wilhelm: *See*—
Forster, Hermann; Schluter, Wilhelm; and Sterr, Horst, 4,015,829.
Lohmann, Dieter: *See*—
Bitzer, Diethelm; and Lohmann, Dieter, 4,016,013.
Lohmar, Elmar: *See*—
Gehrmann, Klaus; Ohorodnik, Alexander; Lohmar, Elmar; and Riechmann, Wernfried, 4,016,048.
Loiko, Evgeny Nikolaevich: *See*—
Samorodov, German Ivanovich; Loiko, Evgeny Nikolaevich; Olshevsky, Orest Viktorovich, deceased; Olshevskaya, Valentina Mikhailovna, administrator; Olshevsky, Alexandr Orestovich, administrator; Olshevsky, Viktor Alexandrovich, administrator; and Olshevskaya, Nina Alexandrovna, administrator, 4,016,485.
Lotsch, Wolfgang, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Phenyl-substituted phthalazone azo dyes with a coupling component of the phenol, napthol, acetoacetarylide, pyrazolone, quinolone, pyridine, pyrimidone or isoquinolone series. 4,016,151, Cl. 260-154.000.
Loubier, Robert J.: *See*—
Dellinger, Eugene L.; and Loubier, Robert J., 4,015,333.
Louchis, Stavros D.: *See*—
Stankovich, Ivan D.; and Louchis, Stavros D., 4,016,053.
Love, Richard R. Overwidth device for flat bed truck or trailer. 4,015,858, Cl. 280-656.000.
Lowther, Frank Eugene, to Union Carbide Corporation. Corona reaction method and apparatus. 4,016,060, Cl. 204-176.000.
Loznak, Edward J.; and Wood, Eugene L. Impaling transfer process and apparatus. 4,015,872, Cl. 294-61.000.
Lubrizol Corporation, The: *See*—
Wiese, Herbert Frederick, deceased; Wiese, Helen G., executrix; and Wierber, Emil Thomas, 4,016,150.
Luchi, Vinicio. Knitted fabrics having pattern effects. 4,015,443, Cl. 66-9.00R.
Lucke, Josef: *See*—
Forster, Hermann; Schluter, Wilhelm; and Sterr, Horst, 4,015,829.
Lodige, Wilhelm; Lodige, Fritz; and Lucke, Josef, 4,015,830.
Lunar Industries, Inc.: *See*—
Koerbel, Claus E.; and McIntyre, Kenneth M., 4,015,871.
Lundell, Karl Erik Bjorn: *See*—
Tisell, Claes-Gustav Erik Yngve; Lundell, Karl Erik Bjorn; Horner, Sven Henry Nilsson; Thorstensson, Gustav Yngve; and Karlstedt, Gustav Sven Erik, 4,015,860.
Luthardt, Hans J., to Akzo N.V. Method of coating a cellulosic substrate with an adherent polymeric coating. 4,016,312, Cl. 427-303.000.
Lutter, Arnold. Device for separating flange pipes. 4,015,324, Cl. 29-239.000.
Lutz, Bruce Leo: *See*—
Anderson, John Dale; and Lutz, Bruce Leo, 4,015,520.
MacDiarmid, Alan G.: *See*—
Garito, Anthony Frank; Heeger, Alan J.; MacDiarmid, Alan G.; Bright, Arthur A.; Cohen, Marshall J.; and Mikulski, Chester M., 4,016,331.
Macemon, James H.; and Soodak, Charles I., to Baxter Travenol Laboratories, Inc. Single knob rotary control of meter damping and push control of damping override. 4,016,491, Cl. 324-128.000.
MacFarlane, Walter J.; and Koss, Dieter G., to Stanley Works, The. Pendant for drapery traverse rod. 4,015,310, Cl. 16-87.40R.
Machanian, William V., to Wurlitzer Company, The. Electronic musical instrument using plural programmable divider circuits. 4,016,495, Cl. 328-18.000.
Machi, Sueo; Aono, Taiji; Matui, Yasushi; Hibi, Yoshiharu; and Shinano, Takayuki, to Japan Atomic Energy Research Institute; Maruzen Oil Co., Ltd.; and Mitsuhashi Kakoki Kaisha Ltd. Novel composite comprising a special graft-copolymer. 4,016,134, Cl. 260-42.240.
Machinery Brokers, Inc.: *See*—
Grayston, Judson M., 4,015,371.
MacKay, Kenneth D.; and Sudderth, R. Brantley, to General Mills Chemicals, Inc. Use of fluorinated β-diketones in the solvent extraction of zinc. 4,015,980, Cl. 75-120.000.
MacLean, Charles A. Chess-like game. 4,015,849, Cl. 273-131.0KC.
Magdo, Ingrid Emese; and Magdo, Steven, to International Business Machines Corporation. High performance integrated bipolar and complementary field effect transistors. 4,016,596, Cl. 357-43.000.
Magdo, Steven: *See*—
Magdo, Ingrid Emese; and Magdo, Steven, 4,016,596.
Magla Products: *See*—
Hanopole, Irwin, 4,015,719.
Maher, John P.; and Johnson, Theodore W., to Sprague Electric Company. Glass containing resistor having a sub-micron metal film termination. 4,016,525, Cl. 338-309.000.
Maichuk, Jury Fedorovich: *See*—
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.
Maieli, Joseph R.; Rosenthal, Gordon; and Torrillo, Domenick T., to Fairchild Industries Inc. Aircraft wing. 4,015,787, Cl. 244-42.0DA.
Maier, Roland: *See*—
Wetzel, Bernd; Woitun, Eberhard; Maier, Roland; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,016,263.
Maillard, Gilbert, to Manufacture de Machines du Haut-Rhin S.A. Revolver cylinder for the ejection of rimless cartridge cases. 4,015,356, Cl. 42-68.000.
Makimoto, Mistuo; Yamashita, Sadahiko; Yano, Yoshiharu; and Yamamoto, Junichi, to Matsushita Electric Industrial Co., Ltd. Method and system for measuring doppler frequency shift of an echo. 4,016,568, Cl. 343-8.000.
Makino, Hiroshi, to West Electric Company, Ltd. DC to DC converter. 4,016,475, Cl. 321-2.000.
Malick, Emil A.: *See*—
Arnold, Philip M.; and Malick, Emil A., 4,016,300.
Malick, Frank. Elastic stocking. 4,015,296, Cl. 2-239.000.
Malinowski, Eugene J.; and Zyck, Raymond J., to TRW Inc. Method and apparatus for shaping an airfoil. 4,015,509, Cl. 90-13.500.
Mallory, Edwin E.; and Tolan, John R., to Milliken Research Corporation. Cutter. 4,015,498, Cl. 83-564.000.
Malmstrom, Olov Valdemar: *See*—
Jonsson, Arne Ingvar; Malmstrom, Olov Valdemar; and Tibell, Bengt Gunnar Julius, 4,015,614.
Maltz, Martin S.: *See*—
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Mancuso, Ettore J., Jr.: *See*—
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Mandell, Ronald D., to Sta-Rite Industries, Inc. Assembly for sealing and pressure equalization of a submersible housing. 4,015,633, Cl. 138-89.000.
Mangel, Karl. Master door operator for vertically movable elevator gates and landing doors. 4,015,688, Cl. 187-52.0LC.
Mangiardi, Vito J.: *See*—
Lewin, Nathan; and Mangiardi, Vito J., 4,015,939.
Manne, John E. Crown form and method. 4,015,332, Cl. 32-12.000.
Manufacture de Machines du Haut-Rhin S.A.: *See*—
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Marion, Charles P., to Texaco Development Corporation. Recovery of particulate carbon from synthesis gas. 4,016,102, Cl. 252-373.000.
Marion, Charles P., to Texaco Development Corporation. Recovery of particulate carbon from synthesis gas. 4,016,103, Cl. 252-373.000.
Marion, Charles P., to Texaco Development Corporation. Recovery of particulate carbon from synthesis gas. 4,016,104, Cl. 252-373.000.
Marion County Muscular Dystrophy Foundation: *See*—
Ryan, John Patrick; and Hart, Jack B., 4,015,725.
Markert, Jurgen: *See*—
Liechti, Hans Wilhelm; and Markert, Jurgen, 4,015,934.
Markhart, Albert H.: *See*—
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Markinson, William C.: *See—*
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Markofsky, Sheldon B.; and Wood, Louis L., to W. R. Grace & Co. Process and composition for breaking emulsions. 4,016,101, Cl. 252-344.000.
Marlin, Donald H.: *See—*
Selmeczi, Joseph G.; Marlin, Donald H.; and Kestner, Daniel W., 4,015,997.
Marquis, Kenneth E.: *See—*
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Marsh, Lawrence B., to Marsh-McBirney, Inc. Spherical electromagnetic water current velocity sensor with protruding electrodes. 4,015,471, Cl. 73-194.0EM.
Marsh-McBirney, Inc.: *See—*
Marsh, Lawrence B., 4,015,471.
Marsh, Ronald W.; and Marulic, Walter J., to Pullman Incorporated. Operating mechanism for double sliding doors. 4,015,866, Cl. 292-36.000.
Marshall, Preston F., to Kendall Company, The. Biaxially oriented nonwoven fabric having long and short fibers. 4,016,319, Cl. 428-113.000.
Marshall, Richard A.: *See—*
Smith, Edwin Studley; and Marshall, Richard A., 4,016,350.
Martel, Jacques; and Heymes, Rene, to Roussel-UCLAF. Cephalosporin derivatives. 4,016,158, Cl. 260-243.00C.
Martenson, Donald S. Fireplace heater. 4,015,581, Cl. 126-121.000.
Martin, David R.: *See—*
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Martinez, F. Jesus; and Schnell, William J., to Baxter Laboratories, Inc. Staged membrane diffusion device and membrane support. 4,016,081, Cl. 210-321.00B.
Marulic, Walter J.: *See—*
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Maruzen Oil Co., Ltd.: *See—*
Machi, Sueo; Aono, Taiji; Matui, Yasushi; Hibi, Yoshiharu; and Shinano, Takayuki, 4,016,134.
Marzalek, Michael S., to Hewlett-Packard Company. Variable rate rotary pulse generator. 4,016,432, Cl. 307-233.00A.
Mashimo, Yukio: *See—*
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Masi, James V.: *See—*
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Mason, George W.; and Lewey, Sonia, to United States of America, Energy Research and Development Administration. Process for separation of the rare earths by solvent extraction. 4,016,237, Cl. 423-21.000.
Mason, Henry L., to Precision Plastics Industries, Inc. End plug for rolled materials. 4,015,711, Cl. 206-/413.000.
Mason, William B., to ECC Corporation. Circuit for controlling the charging current supplied to a plurality of battery loads in accordance with a predetermined program. 4,016,474, Cl. 320-15.000.
Masonite Corporation: *See—*
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Green, Howard; and Rheinwald, James G., 4,016,036.
Stern, Ernest; and Williamson, Richard C., 4,016,412.
Masselle, Francis L., to Singer Company, The. Flexible visual display system. 4,015,342, Cl. 35-12.00N.
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Matsuda, Kazuo; Ohmura, Hidemasa; and Sakai, Takeyo, to Kao Soap Co., Ltd. Aqueous cationic polyurethane having blocked NCO groups and process. 4,016,120, Cl. 260-29.2TN.
Matsuda, Kazuo; Ohmura, Hidemasa; and Sakai, Takeyo, to Kao Soap Co., Ltd. Aqueous polyurethane having blocked NCO groups and process. 4,016,121, Cl. 260-29.2TN.
Matsuda, Kazuo; Ohmura, Hidemasa; and Sakai, Takeyo, to Kao Soap Co., Ltd. Anionic aqueous polyurethane having blocked NCO groups and process. 4,016,122, Cl. 260-29.2TN.
Matsuda, Kazuo; Ohmura, Hidemasa; and Niimi, Yukihisa, to Kao Soap Co., Ltd. Process for preparation of cationic resin aqueous emulsions. 4,016,123, Cl. 260-29.2TN.
Matsuda, Saburo: *See—*
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Matsuda, Yoshio; and Nogai, Akira, to Yoshida Kogyo Kabushiki Kaisha. Slide fastener tape. 4,015,449, Cl. 66-195.000.
Matsuda, Yoshio; and Tsubokawa, Yoshitoki, to Yoshida Kogyo Kabushiki Kaisha. Concealed slide fasteners. 4,015,450, Cl. 66-195.000.
Matsui, Katsuaki: *See—*
Murayama, Keisuke; Morimura, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohta, Noriyuki; and Osawa, Hisayou, 4,016,168.
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Matsumoto, Seiichi; and Hosoe, Kazuya, to Canon Kabushiki Kaisha. Level detection system having a band-pass characteristic and a servo system including the same. 4,016,471, Cl. 318-629.000.
Matsuo, Takashi: *See—*
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Matsushima, Tomoo; Odajima, Tsutou; Tsuruki, Junzo; and Yoshida, Yasuo, to Showa Denko Kabushiki Kaisha. Method for production of magnesium-containing briquets and magnesium. 4,015,978, Cl. 75-10.00A.
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Nakamura, Hirokazu, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Diaphragm air pump. 4,015,913, Cl. 417-471.000.
Nakamura, Zenzo: *See*—
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Nakane, Katsumi: *See*—
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Nanya, Takashi, to Nippon Electric Company, Ltd. Asynchronous arbiter. 4,016,539, Cl. 340-147.0LP.
Narushima, Uraji; and Moriwake, Takashi, to Nippon Paint Co., Ltd. Surface treating agent for processing of metals. 4,016,087, Cl. 252-40.700.
Nash, John E.; and Reader, Trevor D., to Star Dental Manufacturing Co., Inc. Collet wrench. 4,015,335, Cl. 32-27.000.
National Can Corporation: *See*—
Theobald, Marvin G.; and Olson, Richard G., 4,015,325.
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Helszajn, Joseph, 4,016,509.
National Semiconductor Corporation: *See*—
Compton, James B., 4,016,595.
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NCR Corporation: *See*—
Farber, Sheldon, 4,016,174.
Perry, George J., 4,015,842.
Neff, Joseph J., to Bell & Howell Company. Character printing apparatus. 4,015,521, Cl. 101-99.000.
Nehmey, Sam Donald, to B. F. Goodrich Company, The. Multiple strand die head. 4,015,926, Cl. 425-464.000.
Nehrig, R. Harlan: *See*—
Graafsma, Richard S.; and Nehrig, R. Harlan, 4,015,825.
Nelson, Eugene A.; and Rice, Woodrow R., to Mid-States Laboratories, Inc. Ear mold injection dispenser. 4,015,602, Cl. 128-234.000.
Nelson, Lowell F., to Enterprise Brass Works. Automatic nozzle assembly. 4,015,647, Cl. 141-206.000.
Nelson Research & Development Company: *See*—
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Neuhof, Jacob, to General Signal Corporation. Concave diaphragm for electro-acoustic transducer. 4,016,376, Cl. 179-115.00R.
Neumaier, Peter, to Institut Dr. Friedrich Forster, Prufgeratebau. Arrangement of eddy current scanning coils. 4,016,487, Cl. 324-37.000.
Neussel, Paul: *See*—
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Bartenfeld, William Chelsea; Bryant, Clifford Aldene; and Newman, Wilbur Koontz, Sr., 4,015,550.
Newman, William, to Utah Research & Development Co., Inc. DC powered capacitive pulse charge and pulse discharge battery charger. 4,016,473, Cl. 320-14.000.
Nicholas Proprietary Ltd.: *See*—
McLennan, Noel, 4,015,768.
Nichols, Cyril, to Leonard Gould & Company Limited. Containers and a cushion support for use therein. 4,015,716, Cl. 206-521.000.
Nichols, Walter A., to Philip Morris Incorporated. Apparatus for making cigarette filters. 4,015,514, Cl. 93-1.00C.
Nicoll, Andrew R.: *See*—
Sahm, Peter R.; and Nicoll, Andrew R., 4,016,014.
Nicoloso, Dante, to Delle-Alsthom. Sealing device for an assembly of elements of high-voltage cut-out devices. 4,016,383, Cl. 200-148.00F.
Niederst, Jean-Pierre; and Holzinger, Karl, to Herbert Kannegiesser Kommanditgesellschaft. Device for producing molded articles from foamable plastics. 4,015,920, Cl. 425-451.900.
Nighan, William L.; and Wiegand, Walter J., to United Technologies Corporation. High power electric discharge method and apparatus for laser chemical synthesis and other applications. 4,016,448, Cl. 313-231.000.
Niimi, Yukihisa: *See*—
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Nishioka, Tetsuji, to Nissan Motor Co., Ltd. Air cushion actuation and malfunction detection and recording circuit. 4,016,426, Cl. 307-10.00R.
Nissan Motor Co., Ltd.: *See*—
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Nodera, Katsuji: *See*—
Satomi, Takeo; Hino, Naganori; Tateishi, Koshi; Hirano, Masachika; Mukai, Kunio; Nodera, Katsuji; and Sasaki, Mitsuru, 4,015,974.
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Nomura, Katsuhiko, to Asahi Kogaku Kogyo Kabushiki Kaisha. Exposure value display for cameras. 4,016,576, Cl. 354-55.000.
Nordlund, Signar: *See*—
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Normann, Nils A., to Baylor College of Medicine. Balloon activated blood pump. 4,015,590, Cl. 128-1.00D.
Norris, Alan H., to Champion International Corporation. Integrated indicator system for solvent removal. 4,016,019, Cl. 156-64.000.
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Norton, Charles J.; and Falk, David O., to Marathon Oil Company. Polyacrylamide polymers derived from acrylonitrile without intermediate isolation. 4,016,086, Cl. 252-8.55D.
Norwood Marking & Equipment Company: *See*—
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Novikoff, Eugene B.; and Pruzick, Ronald, to Knogo Corporation. Article detection system with near field electromagnetic wave control. 4,016,553, Cl. 340-280.000.
Noyes, Harry M., to Fenestra. Reinforced door frame. 4,015,382, Cl. 52-204.000.
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Nutter, Dale E., to Heat/Fluid Engineering Corporation. Centrifugal separator for separating entrained liquid from a stream of liquid-bearing gases. 4,015,960, Cl. 55-355.000.
Oak Industries Inc.: *See*—
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O'Connor, Robert. Paper roll and spindle ejection device. 4,015,788, Cl. 242-55.200.
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Oesterle, Gerhard, to Aktiengesellschaft Adolph Saurer. High speed broad fabric loom reed construction. 4,015,640, Cl. 139-192.000.
Ogasawara, Toyotsugu, to Tomy Kogyo Co., Inc. Machine for use in teaching the manner in which a clock indicates time. 4,015,346, Cl. 35-39.000.
Ogawa, Kinya; Kurimoto, Kazuhiko; Eguchi, Yoshitsugu; and Kuwata, Satoshi, to Shin-Etsu Chemical Company Limited. Bulk polymerization of vinyl chloride. 4,016,341, Cl. 526-62.000.
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Ohta, Wasaburo; and Hirakura, Koji, to Kabushiki Kaisha Ricoh. Inorganic photoconductor in glass binds with glass overcoat layer. 4,015,984, Cl. 96-1.500.
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Ohya, Shuichi; and Kikuchi, Masanori, to Nippon Electric Company, Ltd. Non-volatile semiconductor memory device. 4,016,588, Cl. 357-23.000.
Oishi, Yasushi; and Hinata, Masanao, to Fuji Photo Film Co., Ltd. Color light-sensitive material with spontaneously developable silver halide emulsion containing desensitizing dye. 4,015,989, Cl. 96-77.000.
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Oldford, William G. U-bolt clamping element. 4,015,313, Cl. 24-277.000.
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O'Neill, Wilbur J., to Westinghouse Electric Corporation. Diving helmet assembly. 4,015,294, Cl. 2-2.10R.
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Onoda, Takeru; Wada, Keisuke; and Otake, Masayuki, to Mitsubishi Chemical Industries Ltd. Process for preparing carboxylic acid esters from toluene and xylene. 4,016,200, Cl. 260-488.0CD.

Onopchenko, Anatoli; and Schulz, Johann G. D., to Gulf Research & Development Company. Process for preparing pyromellitic acid. 4,016,206, Cl. 260-524.00N.

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Oquita, Ramiro. Pinata having weakened bottom wall and means for breaking same. 4,015,364, Cl. 46-11.000.

O'Reilly, Agnes C.: *See—*
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Oshida, Yoshiki, to Mitsubishi Jukogyo Kabushiki Kaisha. Method for surface treatment of metallic materials. 4,016,012, Cl. 148-16.500.

Oshima, Kohei: *See—*
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Otake, Masayuki: *See—*
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Otani, Sugio; Watanabe, Shoji; and Araki, Tadashi, to Kureha Kagaku Kogyo Kabushiki Kaisha; and Toyo Boseki Kabushiki Kaisha. Production of carbon shaped articles having high anisotropy. 4,016,247, Cl. 423-447.400.

Otsuki, Shoji; Kuroishi, Kenjiro; and Ohara, Eiji. Twisting machine. 4,015,415, Cl. 57-34.00R.

Otsuki, Susumu; Uchida, Kanichi; and Miyanohara, Isao, to Toyo Soda Manufacturing Co., Ltd. Stabilization of 1,1,1-trichloroethane. 4,016,215, Cl. 260-652.50R.

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Walters, Charles W., 4,016,465.

Paal, Gabor; and Wustenhagen, Jurgen F., to International Business Machines Corporation. Method of developing and stripping positive photoresist. 4,015,986, Cl. 96-36.000.

Pacher, Marielise: *See—*
Koller, Stefan; Lapple, Arnulf Ruediger; and Pacher, Marielise, 4,015,933.

Padar, Steven: *See—*
Meuresch, Herbert; Padar, Steven; and Zimmerhackel, Franz, 4,015,757.

Pagani, Ezio, to National Distillers and Chemical Corporation. Valve for use with inflatable articles such as pneumatic boats. 4,015,622, Cl. 137-223.000.

Page, Robert E., to United States of America, Navy. Mos shift register compensation system for defective tracks of drum storage system. 4,016,547, Cl. 340-172.500.

Paige, Janet N.: *See—*
Thill, Bruce P.; and Paige, Janet N., 4,016,171.

Pandey, Kailash Narain, to Texas Instruments Incorporated. Apparatus for storing data broadcast in digital form for generating a character display or for recording such data for later playback. 4,016,361, Cl. 358-83.000.

Pandick Press, Inc.: *See—*
Hemminger, William F., 4,015,793.

Pannell, Ralph: *See—*
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Pantier, Earl A.: *See—*
Jackovitz, John F.; and Pantier, Earl A., 4,016,091.

Pantone, Inc.: *See—*
Herbert, Lawrence, 4,015,524.

Paper Converting Machine Company: *See—*
Spencer, Harvey J., 4,015,724.

Pappas, John A.: *See—*
Cassidy, Robert L.; Cosco, Robert J.; and Pappas, John A., 4,016,445.

Papworth, Charles A. Tank cleaning apparatus. 4,015,613, Cl. 134-102.000.

Paque, Michael W., to Kroy Industries Inc. Tape advance mechanism. 4,015,700, Cl. 197-84.00R.

Paraskos, John A.: *See—*
Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,016,069.
Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,016,070.

Parise, Carl: *See—*
Wimsatt, James M.; and Parise, Carl, 4,015,589.

Parise & Sons, Inc.: *See—*
Wimsatt, James M.; and Parise, Carl, 4,015,589.

Park, Arthur: *See—*
Craig, James T., Jr.; and Park, Arthur, 4,015,673.

Parker, Ralph L.; and Hoskins, Daniel B., to TRW Inc. Push button switch with indicator. 4,016,561, Cl. 340-381.000.

Parquet, Donald J.; Pedersen, Carl O.; and Barton, Robert M., to J. I. Case Company. Automatic control system for backhoe. 4,015,729, Cl. 214-138.00R.

Pasche, Rene C., to Baumgartner Papiers S.A. Cigarette filter tip. 4,015,610, Cl. 131-9.000.

Pastoriza, James J., to Analog Devices, Inc. Digital-to-analog converter having transient suppressor system. 4,016,559, Cl. 340-347.0DA.

Patenge, Tilo: *See—*
Meuresch, Herbert; and Patenge, Tilo, 4,015,752.

Paterson, Malcolm M., to Raytheon Company. Magnetic separation apparatus. 4,016,071, Cl. 209-39.000.

Patterson, Frank Knowles, to Du Pont de Nemours, E. I., and Company. Dielectric substrate bearing nickel boride conductor. 4,016,447, Cl. 313-218.000.

Paul, Robert A.: *See—*
Fozzard, George B.; and Paul, Robert A., 4,016,049.

Paul, William A. Application of gasket-forming material to workpieces. 4,015,560, Cl. 118-323.000.

Paules, Eugene H. Apparatus and method for converting refuse to useful energy. 4,015,546, Cl. 110-8.00A.

Pauletich, Joseph. Snow field sound imploder. 4,015,684, Cl. 181-120.000.

Pauluis, Gerard J. C. A.; and Miller, Alistair I., to Atomic Energy of Canada Limited. Dual temperature deuterium extraction process. 4,015,944, Cl. 23-270.50W.

Pauwels, Edward M. Game apparatus. 4,015,848, Cl. 273-126.00R.

Pavlik, Frank J.; and Hansen, Robert L., to Minnesota Mining and Manufacturing Company. Film-forming polymer modified with a fluoroaliphatic radical containing compound and hair styling composition thereof. 4,015,612, Cl. 132-7.000.

Pavliny, William. Building lightning protection system. 4,016,462, Cl. 361-117.000.

Pawelczyk, Werner, to Hermann Berstorff Maschinenbau GmbH. Multi-roll calender for rubber or synthetic plastics materials. 4,015,919, Cl. 425-367.000.

Peche, Jack, to Richman, Achille George, a part interest. Coupling device for pneumatic brake lines. 4,015,720, Cl. 213-1.300.

Pecori, Peter M., to United States of America, Army. Land mine detector with pulse slope, width and amplitude determination channels. 4,016,486, Cl. 324-3.000.

Peddle, Charles: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,016,546.

Pedersen, Carl O.: *See—*
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Pedersen, Thomas Josef, to Bell Telephone Laboratories, Incorporated. Addressing arrangements for communications networks. 4,016,369, Cl. 179-15.0AL.

Pedigree Petfoods Limited: *See—*
Burrows, Ian Edward; and Cheney, Peter Arthur, 4,016,295.

Pedinoff, Melvin E., to Hughes Aircraft Company. Method and apparatus for acousto-optic pulse compression. 4,016,563, Cl. 343-5.0SA.

Peer, Thomas Richard: *See—*
Kahan, William; and Peer, Thomas Richard, 4,015,445.

Pelletier, Bernard: *See—*
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Pelletier, Fernand F.: *See—*
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Pemberton, Donald Stuart, to Rist's Wires & Cables Limited. Electrical connector. 4,015,891, Cl. 339-217.00S.

Pennell, Paul H., to Elastomeric Products Inc. Rubber grip for tennis racket handles. 4,015,851, Cl. 273-75.000.

Penner, Wayne A.: *See—*
Cook, Thomas W.; Penner, Wayne A.; Quaglino, Carl A.; Ray, Charles D.; and Scott, Lyndell F., 4,016,531.

Pentapharm A.G.: *See—*
Svendsen, Lars Gundro, 4,016,042.

Perkins, Charles M. Chair construction for long use comfort. 4,015,878, Cl. 297-385.000.

Perrine, Paul M., to American Pelletizing Corporation. Limestone-expanding clay granules and method of making them. 4,015,973, Cl. 71-63.000.

Perry, George J., to NCR Corporation. Bill stacker. 4,015,842, Cl. 271-185.000.

Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich. Medicinal preparation for treatment of viral-etiology diseases. 4,016,289, Cl. 424-315.000.

Persidok, Jacek Antoni, to Motorola, Inc. Three large signal deflection system. 4,016,454, Cl. 315-409.000.

Persinski, Leonard J.; Cook, Michael M.; and Adams, Sally Lee, to Calgon Corporation. Low fluid loss cementing compositions containing hydrolyzed acrylamide/2-acrylamido-2-methylpropane sulfonic acid derivative copolymers and their use. 4,015,991, Cl. 106-90.000.

Personal Products Company: *See—*
Csillag, Charles, 4,015,604.

Peter, Fernand, to Manurhin-Automatic, S.A. Turret lathe. 4,015,491, Cl. 82-2.00R.

Peters, Werner: *See—*
Munzner, Heinrich; Heimbach, Heinrich; Korbacher, Werner; Peters, Werner; Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, 4,015,956.

Petersen, Jorgen Nilaus, to Aktieselskabet Brodrene Hartmann. Package of fiber material or other resilient material for receiving fragile articles, particularly eggs. 4,015,766, Cl. 229-2.5EC.

Petersen, Walter Adrian: *See—*
Forbes Jones, Robin Mackay; and Petersen, Walter Adrian, 4,016,008.

Peterson, Everett A. Electronic sealing apparatus. 4,016,025, Cl. 156-380.000.

Peterson, Laurence I., to Rohm and Haas Company. Anesthetic delivery system. 4,015,599, Cl. 128-188.000.

Peterson, Marvin A.: *See—*
Kasik, Robert L.; and Peterson, Marvin A., 4,016,298.

Petrangelo, Amedio D., to Stromberg-Carlson Corporation. Reusable seal with thermal expansion compensation. 4,015,745, Cl. 220-320.000.

Petro-Tex Chemical Corporation: *See—*
Kerr, Ralph O., 4,016,105.

Petrov, Dmitry Andreevich; and Tumanov, Alexei Tikhonovich. Device for making single-crystal products. 4,015,657, Cl. 164-361.000.

Petzold, Wolfgang, to Schering Aktiengesellschaft. Arrangement for galvanization and chemical treatment of articles. 4,015,831, Cl. 259-81.00R.

Pfister, Stanley Arthur, to Cincinnati Milacron, Inc. Index mechanism. 4,015,487, Cl. 74-813.00L.

Pfizer Inc.: *See—*
Koch, Richard C.; and Richards, Hugh C., 4,016,278.

Pflegerl, Emmerich: *See—*
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Pforzheimer Uhren-Rohwerke Rudolf Wehmer: *See—*
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Pharriss, Bruce B.; Erickson, Ross R.; and Tillson, Stephen A., to Alza Corporation. Method for treating dysmenorrhea with a uterine therapeutic system. 4,016,270, Cl. 424-242.000.

Philip, Morris. Method and apparatus for positively feeding yarn. 4,015,447, Cl. 66-132.00R.

Philip Morris Incorporated: *See—*
Nichols, Walter A., 4,015,514.

Phillipps, Gordon Hanley; English, Alan Frederick; and Stribley, Gillian Helen, to Glaxo Laboratories Limited. 21-Adamantane-1'-carboxylate steroid compositions. 4,016,271, Cl. 424-243.000.

Phillips, David T.: *See—*
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Phillips Petroleum Company: *See—*
Arnold, Philip M.; and Malick, Emil A., 4,016,300.
Campbell, Robert W., 4,016,145.
Fozzard, George B.; and Paul, Robert A., 4,016,049.
Kinney, Alfred W., 4,015,644.
Porter, Grady T., 4,016,074.

Photo Systems, Inc.: *See—*
Chapman, Robert E., 4,016,585.

Pichl, Heinz, to AB Volvo Penta. Outboard motor for reducing exhaust gas pollutants. 4,015,429, Cl. 60-298.000.

Pierrot, Francis: *See—*
Pompei, Jean; Lacroix, Bernard; and Pierrot, Francis, 4,016,524.

Pietrucha, Victor F.; Minard, Michael E.; and Ozmec, Gordon J., to Airco, Inc. Apparatus for depositing carbon dioxide snow. 4,015,440, Cl. 62-166.000.

Pikunov, Mikhail Vladimirovich: *See—*
Rogova, Svetlana Tanovna; Pikunov, Mikhail Vladimirovich; Kuptsova, Alla Ivanovna; Obukhova, Galina Zakharovna; Karalnik, Dmitry Mikhailovich; and Rybakov, Anatoly Ivanovich, 4,015,981.

Pilloff, Herschel S., to United States of America, Navy. Explosively driven laser amplifier system. 4,016,500, Cl. 330-4.300.

Pintschovius, Ulrich; Schinzel, Erich; and Rosch, Gunter, to Hoechst Aktiengesellschaft. Monostyryl-naphthalene derivatives. 4,016,195, Cl. 260-475.0FR.

Piper, Ortwin: *See—*
Eyb, Wolfgang; Soffge, Friedhelm; Piper, Ortwin; and Albrecht, Gerhard, 4,015,303.

Pircher, Herbert; and Hambuch, Johannes, to Buro Patent AG. Automatic railless ground conveyor installation. 4,015,680, Cl. 180-98.000.

Pitney-Bowes, Inc.: *See—*
Hallenbeck, Richard A., 4,016,467.

Pittet, Henri. Recording scale, for the recovery of used materials such as waste paper. 4,015,676, Cl. 177-5.000.

Pittman Products, Inc.: *See—*
Contreras, Boris L., 4,015,630.

Plaat, C. Lucas: *See—*
Wanstreet, Gregory E.; and Plaat, C. Lucas, 4,015,624.

Plank, Charles J.; Rosinski, Edward J.; and Rubin, Mae K., to Mobil Oil Corporation. Crystalline zeolite and method of preparing same. 4,016,245, Cl. 423-328.000.

Plantard, Dominique: *See—*
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Levecque, Marcel; Battigelli, Jean A.; and Plantard, Dominique, 4,015,964.

Plati, John Thomas: *See—*
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Platt Saco Lowell Limited: *See—*
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Plattner, Werner, executor: *See—*
Fauland, Erich; Kampe, Wolfgang; Stach, Kurt, deceased; Plattner, Werner, executor; Stork, Harald; and Dietmann, Karl, 4,016,262.

Plessey Incorporated: *See—*
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Pliskin, William Aaron: *See—*
Aboaf, Joseph Adam; Broadie, Robert Wallace; and Pliskin, William Aaron, 4,016,017.

Pluschkell, Wolfgang; and Wisnewski, Heinrich, to Hoesch Werke Aktiengesellschaft. Method of and device for stripping off a lost measuring head detachably placed upon a measuring lance. 4,015,475, Cl. 73-343.00R.

Podgorsak, Ervin B.: *See—*
Moran, Paul Richard; Podgorsak, Ervin B.; and Fields, David E., 4,016,422.

Poirier, Victor L.; and Keiser, John T., to United States of America, America. Method of flocking blood-contacting surfaces on artificial implant devices. 4,016,303, Cl. 427-2.000.

Polak's Frutal Works N.V.: *See—*
Cohen, Amnon Mordechai, 4,016,109.

Polaroid Corporation: *See—*
Finelli, Patrick L., 4,016,580.
Friedman, Harvey S., 4,016,578.
Kolesinski, Henry S.; Mehta, Avinash C.; and Taylor, Lloyd D., 4,016,340.
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Wareham, Richard R., 4,016,582.

Polkinghorn, Melvin William: *See—*
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Pollinger, Hans; Prahl, Franz; and Schorwerth, Mathias, to Knorr-Bremse GmbH. Disc brake for railway vehicles. 4,015,691, Cl. 188-59.000.

Pomara, Johnny B., Jr., to El Chico Corporation. Food processing device. 4,015,517, Cl. 99-355.000.

Pompei, Jean; Lacroix, Bernard; and Pierrot, Francis, to U.S. Philips Corporation. Sensor for a gas detector, in particular for smoke detection. 4,016,524, Cl. 338-34.000.

Pontier, Claude: *See—*
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Poot, Cornelis: *See—*
Kattenberg, Hans Robert; and Poot, Cornelis, 4,016,302.

Pope, Kenneth Elvin. Anti-skid control system. 4,015,695, Cl. 188-181.00A.

Popeil Brothers, Inc.: *See—*
Popeil, Samuel J.; and Ruiz, Lorenzo Anthony, 4,015,330.

Popeil, Samuel J.; and Ruiz, Lorenzo Anthony, to Popeil Brothers, Inc. Cutting board case and knife set. 4,015,330, Cl. 30-124.000.

Port Authority of N.Y. & N.J., The: *See—*
Roxberry, Richard C., 4,015,540.

Porter, Grady T., to Phillips Petroleum Company. Chromatographic separation. 4,016,074, Cl. 210-31.00C.

Posey, Wayne S.: *See—*
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Post, Allen E.: *See*—
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Pourrias, Bernard M.: *See*—
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Pouw, Theodorus Johannes Antonius: *See*—
Leurs, Gerardus Cornelis; Bosma, Rumoldus Matthijs Marinos Johannes; and Pouw, Theodorus Johannes Antonius, 4,015,754.
Poy, Guy, to Rhone-Poulenc S.A. Process for the preparation of polyvinyl chloride foams. 4,016,116, Cl. 260-2.50P.
PPG Industries, Inc.: *See*—
Anderson, Carl Clement; and Dowbenko, Rostyslaw, 4,016,332.
Cunningham, Hugh; Raetzsch, Carl W.; Rich, George L.; and Driskill, John D., 4,016,064.
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Prahl, Franz: *See*—
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Prange, Dieter. Self-adhering letter assembly. 4,015,352, Cl. 40-125.00A.
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Precision Valve Corporation: *See*—
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Meuresch, Herbert; Padar, Steven; and Zimmerhackel, Franz, 4,015,757.
Preston, Frank J.; Babiec, John S., Jr.; and Maxwell, Clifford J., to Olin Corporation. Use of Schiff bases as cross-linking agents for high resilience polyurethane foam. 4,016,113, Cl. 260-2.5AM.
Preuss, Friedrich; and Difflipp, Kurt, to Roland Offsetmaschinenfabrik Faber & Schleicher AG. Multicolor sheet-fed printing press. 4,015,522, Cl. 101-183.000.
Price, John G. Apparatus for slitting belt material. 4,015,791, Cl. 242-56.200.
Priebe, Norman F.: *See*—
Law, Wendell A.; Barrett, William G.; Priebe, Norman F.; and Wise, Harry D., 4,016,367.
Law, Wendell A.; Barrett, William G.; Priebe, Norman F.; and Wise, Harry D., 4,016,548.
Priestley, Joseph Amos: *See*—
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Primo, Angelo M. Zostera seaweed articles and methods of preparing and utilizing same. 4,016,084, Cl. 252-8.100.
Pringle, John Philip, to Capital Wire and Cable, Division of U.S. Industries. Process of making laminated structural member. 4,016,232, Cl. 264-112.000.
Pringle, John Philip, to Capital Wire and Cable, Division of U.S. Industries. Process of making a flexible structural member. 4,016,233, Cl. 264-122.000.
Prins N.V.: *See*—
Prins, Pier, 4,015,399.
Prins, Pier, to Prins N.V. Building, method and apparatus for the construction thereof. 4,015,399, Cl. 52-747.000.
Profet, Anthony G., to Templeton, Kenly & Company. Jack safety stop. 4,015,824, Cl. 254-89.00R.
Prokai, Bela; and Kanner, Bernard, to Union Carbide Corporation. Organosilicone polymer solutions. 4,016,000, Cl. 106-316.000.
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Gutridge, Jack E.; and Raidt, Patricia A., 4,015,542.
Marsh, Ronald W.; and Marulic, Walter J., 4,015,866.
Pulte, William J. House with unfinished bonus space. 4,015,385, Cl. 52-236.000.
Purex Corporation Ltd.: *See*—
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R. A. Pearson Company: *See*—
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R. Stahl Aufzuege GmbH: *See*—
Schumacher, Gunter; Tef, Peter; and Wiester, Max, 4,015,835.
Rabstejnek, Carl V.: *See*—
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Rahman, Yueh Erh, to United States of America, Energy Research and Development Administration. Method of encapsulating polyaminopolycarboxylic acid chelating agents in liposomes. 4,016,290, Cl. 424-319.000.
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Rajadhyaksha, Vithal J.; Schroer, Richard A.; Brock, Phillip J.; and Krueger, Earl R., to Nelson Research & Development Company. Prostaglandin dehydrogenase inhibiting agents. 4,016,223, Cl. 260-946.000.
Rajadhyaksha, Vithal Jagannath, to Nelson Research & Development Company. Method of synthesis of trans-2-phenylcyclopropylamine. 4,016,204, Cl. 260-515.00R.
Rambo, Sheldon I., to Westinghouse Electric Corporation. High-reliability power amplifier. 4,016,503, Cl. 330-124.00D.
Ramond, Louis Maurice. Frame for various cycles. 4,015,854, Cl. 280-281.00R.
Ramsey, John L.; and Post, Allen E., to United States of America, Air Force. Programmable variable length high speed digital delay line. 4,016,511, Cl. 333-29.000.
Randolph, Ellwood A. Dilution device. 4,015,628, Cl. 137-566.000.
Randolph, Robert W.: *See*—
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Rasp, Christian; and Grolig, Johann, to Bayer Aktiengesellschaft. Process for the preparation of acetoxybutanols. 4,016,201, Cl. 260-491.000.
Rauland-Borg Corporation: *See*—
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Ray, Richard V. Alarm triggering circuit. 4,016,537, Cl. 340-64.000.
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Ipri, Alfred Charles, 4,016,016.
Kisor, Thaddeus William, 4,015,707.
Ross, Walter Lee, 4,016,564.
Stone, Robert Porter, 4,015,315.
Weimer, Paul Kessler, 4,016,550.
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Nash, John E.; and Reader, Trevor D., 4,015,335.
Rear, Ian Graeme. Fluid operated hammer. 4,015,670, Cl. 173-15.000.
Reber, Walter. Hay-making machine. 4,015,412, Cl. 56-370.000.
Redington, Rowland W.; and Henkes, John L., Jr., to General Electric Company. Mammography table. 4,015,836, Cl. 269-322.000.
Reece, Marvin P.: *See*—
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Reed, Robert D., to John Zink Company. Laminar flow flame arrestor. 4,015,954, Cl. 48-192.000.
Reeder, Thomas M.; and Gilden, Meyer, to United Technologies Corporation. Diode coupled tapped acoustic delay line correlator and convolver. 4,016,514, Cl. 333-30.00R.
Reese, Johannes: *See*—
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Relyveld, Edgar Hans, to Institut Pasteur. Calcium phosphate gel for adsorbing vaccines. 4,016,252, Cl. 424-88.000.

Rembert, Frank: *See—*
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Rempfler, Hermann; Bosshard, Hans; and Weber, Kurt, to Ciba-Geigy Corporation. Process for the manufacture of compounds containing vinyl groups. 4,016,203, Cl. 260-505.00R.
Renard, Jean-Claude: *See—*
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Renfrew, Edgar E., to American Color & Chemical Corporation. Monoazo dyestuff mixtures derived from 2-amino-5-nitro-thiazole and bis-hydroxyalkylamino acklanilides reacted with acid halides and amides. 4,016,153, Cl. 260-158.000.
Research Corporation: *See—*
Kent, Harry A., Jr., 4,016,259.
Travis, James; and Pannell, Ralph, 4,016,149.
Respen, Yves Jean; Cosse, Paul Andre; and Economopoulos, Mario, to Centre de Recherches Metallurgiques-Centrium voor Research in de Metallurgie. Rolled steel rod or bar. 4,016,015, Cl. 148-39.000.
Respen, Yves Jean: *See—*
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Reuschel, Ronrad: *See—*
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Reuter, Wolfgang: *See—*
Wetzel, Bernd; Woitun, Eberhard; Maier, Roland; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,016,263.
Revells, Robert G.; Olson, Earl J.; and Sutton, Charles W., to Libbey-Owens-Ford Company. Glass sheet supporting and conveying apparatus. 4,015,968, Cl. 65-289.000.
Rezac, Howard Dwight. Truck unloading device. 4,015,727, Cl. 214-82.000.
Rheinstahl AG: *See—*
Roosen, Willi, 4,015,541.
Rheinwald, James G.: *See—*
Green, Howard; and Rheinwald, James G., 4,016,036.
Rhone-Poulenc Industries: *See—*
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Cotrel, Claude; Crisan, Cornel; Jeanmart, Claude; and Messer, Mayer Naoum, 4,016,274.
Poy, Guy, 4,016,116.
Rice, Howard E., Jr. Multiplication learning aid device. 4,015,345, Cl. 35-31.00E.
Rice, Woodrow R.: *See—*
Nelson, Eugene A.; and Rice, Woodrow R., 4,015,602.
Rich, George L.: *See—*
Cunningham, Hugh; Raetzsch, Carl W.; Rich, George L.; and Driskill, John D., 4,016,064.
Richards, Clyde N. Electrical insulator with contamination and flash-over eliminator. 4,016,358, Cl. 174-141.00R.
Richards, Hugh C.: *See—*
Koch, Richard C.; and Richards, Hugh C., 4,016,278.
Richardson, Dudley G.: *See—*
Ross, Joseph H.; and Richardson, Dudley G., 4,015,887.
Richardson, James E.; and Swain, Stephen C., to Medical Dispenser Company, The. Tablet package for use in chronologically dispensing tablets. 4,015,717, Cl. 206-534.000.
Richert, Karl Hartwig: *See—*
Blahak, Johannes; Muller, Erwin; and Richert, Karl Hartwig, 4,016,143.
Richman, Achille George: *See—*
Peche, Jack, 4,015,720.
Rickmers, Clifford P., to Hoover Company, The. Vacuum bleed system for a vacuum cleaner or the like. 4,015,308, Cl. 15-339.000.
Ricoh Co., Ltd.: *See—*
Tabata, Yasuhiro, 4,015,892.
Riechmann, Wernfried: *See—*
Gehrmann, Klaus; Ohorodnik, Alexander; Lohmar, Elmar; and Riechmann, Wernfried, 4,016,048.
Riede, Gerhard; and Boberg, Gunnar, to Gambro AG. Device for the diffusion of substances between two fluids via semi-permeable diaphragms. 4,016,082, Cl. 210-321.00B.
Rieder, Milan, to Dekanat Prirodovedecke Fakulty University Karlovy. Precession-type x-ray diffraction camera. 4,016,420, Cl. 250-277.0CH.
Rietveld, Frank P., to Colt Industries Operating Corporation. Wire electrode feed system for electrical discharge machining. 4,016,395, Cl. 219-69.00W.
Ringel, Samuel M.: *See—*
Connor, David T.; Ringel, Samuel M.; and von Strandtmann, Maximilian, 4,016,257.
Ringrose, Peter Stuart: *See—*
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Kwok, Clyde C. K., 4,015,779.
Rist's Wires & Cables Limited: *See—*
Pemberton, Donald Stuart, 4,015,891.
Ritz, Jurgen; and Reese, Johannes, to Hoechst Aktiengesellschaft. Epoxy resin containing acetoacetic groups. 4,016,141, Cl. 260-47.0EP.
Rival Manufacturing Company: *See—*
Aberer, James B., 4,016,387.
Robert Bosch G.m.b.H.: *See—*
Boehringer, Andreas, 4,016,459.
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Weckenmann, Albert; Haas, Lothar; and Brautigam, Rolf, 4,016,490.
Roberts, Spencer Donald: *See—*
Koski, John Alexander; Lissner, Rudolf Werner; and Roberts, Spencer Donald, 4,015,799.
Robertson, George Heddle; and Stirling, John Andrew, to Ciba-Geigy Corporation. Pigment compositions. 4,015,999, Cl. 106-308.00Q.
Robillard, Gene A.: *See—*
Baur, Robert F.; Comey, David M.; and Robillard, Gene A., 4,016,590.
Robinet, Sylvia J. Refrigeration apparatus. 4,015,441, Cl. 62-402.000.
Robson, Harry E., to Exxon Research and Engineering Company. Preparation of catalysts of predetermined pore size distribution and pore volume. 4,016,108, Cl. 252-455.00R.
Robson, Harry E.: *See—*
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Rochat, Daniel-Francois, to Ebauches S.A. Timepiece with digital time display. 4,015,418, Cl. 58-23.00R.
Roche, John J.; and Hunsicker, Glenn L., to Bethlehem Steel Corporation. Scanning pyrometer system. 4,015,476, Cl. 73-355.00R.
Rockwell International Corporation: *See—*
Argyris, Pericles Alexandre; and Williams, William Randolph, 4,015,817.
Hammad, Mohamad, 4,016,371.
Walker, Ferman L., 4,016,565.
Rocton, Lucien, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Connector for optical fibres. 4,015,894, Cl. 350-96.00C.
Rodseth, William G., to Schlage Lock Company. Switch arrangement for door closers. 4,016,381, Cl. 200-61.620.
Rogers, Melvin F., to Zenith Radio Corporation. Color television picture tubes with improved implosion protection system. 4,016,364, Cl. 358-245.000.
Rogers, Ryland F.: *See—*
Howard, Willard L.; and Rogers, Ryland F., 4,015,561.
Rogers, William F., to Lawrence Peska Associates, Inc., a part interest. Laryngectomy lung protector. 4,015,608, Cl. 128-351.000.
Rogova, Svetlana Tanovna; Pikunov, Mikhail Vladimirovich; Kuptsova, Alla Ivanovna; Obukhova, Galina Zakharovna; Karalnik, Dmitry Mikhailovich; and Rybakov, Anatoly Ivanovich. Tooth filling alloy. 4,015,981, Cl. 75-134.00B.
Rohde, Vernon Carl, to Du Pont de Nemours, E. I., and Company. Method of gradient separation. 4,015,775, Cl. 233-26.000.
Rohm and Haas Company: *See—*
Larsson, Bjorn E.; and Le Sota, Stanley, 4,016,127.
Peterson, Laurence I., 4,015,599.
Shoults, Royland D.; and Yost, Robert S., 4,016,199.
Roland, John Thomas, to AMP Incorporated. Starting circuit for switching regulator. 4,016,461, Cl. 361-18.000.
Roland Offsetmaschinenfabrik Faber & Schleicher AG: *See—*
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Roll, Edward: *See—*
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Rollet, Bernard: *See—*
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Rollins, Dallas W.; Randolph, Robert W.; and Garner, Gerald D., to ACF Industries, Incorporated. Quick change fluidizing outlet assembly. 4,015,751, Cl. 222-195.000.
Romano, Ralph, to Grand Machining Company. Capped wheel nut. 4,015,503, Cl. 85-35.000.
Romberg, Felix B. Wire stretcher and fastener. 4,015,823, Cl. 254-72.000.
Roosen, Willi, to Rheinstahl AG. Bogie draft links. 4,015,541, Cl. 105-199.00R.
Roosild, Sven A.: *See—*
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Rosan Hydraulics Inc.: *See—*
Rosan, Jose, Sr.; and Reece, Marvin P., 4,015,504.
Rosan, Jose, Sr.; and Reece, Marvin P., to Rosan Hydraulics Inc. Self-boring fastener and methods of use thereof. 4,015,504, Cl. 85-42.000.
Rosch, Gunter: *See—*
Pintschovius, Ulrich; Schinzel, Erich; and Rosch, Gunter, 4,016,195.
Rose, Levi L. Emergency traffic control system with security transmission coding. 4,016,532, Cl. 340-32.000.
Rosenblood, Lorne K.: *See—*
Hayward, John S.; Collis, Martin S.; Eckerson, John D.; and Rosenblood, Lorne K., 4,015,300.
Rosenthal, Gordon: *See—*
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Rosinski, Edward J.: *See—*
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Ross, Anthony J.; and Ross, James A. Vehicle trailer hitch. 4,015,857, Cl. 280-495.000.
Ross, James A.: *See—*
Ross, Anthony J.; and Ross, James A., 4,015,857.
Ross, Joseph H.; and Richardson, Dudley G. Lamp circuit connector for trailers. 4,015,887, Cl. 339-6.00R.
Ross, Walter Lee, to RCA Corporation. Multiple target data receiver for a collision avoidance system. 4,016,564, Cl. 343-6.5LC.

Rossi, Enzo: *See—*
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Roth, Adrian W., to Sprecher & Schuh AG. Travelling switching block for metallic encapsulated high voltage switching installation. 4,016,382, Cl. 200-148.00R.
Roth, Howard; Baldry, Peter R.; Kaufman, Harold B., Jr.; McCarthy, John P.; and Wallenfels, Kurt, to DCA Food Industries Inc. Apparatus for forming a variety of shaped bodies with an internal filling. 4,015,518, Cl. 99-450.600.
Rottneros Bag System AB: *See—*
Goransson, Pehr Gunnar Heine, 4,015,635.
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Rowe Industries Division of Coleman Cable & Wire Company: *See—*
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Roxberry, Richard C., to Port Authority of N.Y. & N.J., The. Electromagnetic transportation system. 4,015,540, Cl. 104-148.0LM.
Rubin, Mae K.: *See—*
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Ruckel, Erwin Richard: *See—*
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Rudge, Alfred John: *See—*
Fielding, Harold Crosbie; and Rudge, Alfred John, 4,016,217.
Rudin, Marvin B. Microminiature integrated circuit impedance device including weighted elements and contactless switching means for fixing the impedance at a preselected value. 4,016,483, Cl. 323-74.000.
Ruiz, Lorenzo Anthony: *See—*
Popeil, Samuel J.; and Ruiz, Lorenzo Anthony, 4,015,330.
Rumpf, Hans: *See—*
Leschonski, Kurt; and Rumpf, Hans, 4,015,958.
Runte, Robert Ralph; and Mau, Theodore A., to Runte, Robert Ralph. Handicapping circuit for electronic games. 4,015,846, Cl. 273-85.00R.
Ruozi, Aldo. Cotton stalk and root shredder with re-bedder. 4,015,667, Cl. 172-133.000.
Russell, Mitchell John. Bingo dice game. 4,015,850, Cl. 273-135.00B.
Russell, Wayne A.: *See—*
Mitchiner, Robert K.; and Russell, Wayne A., 4,015,606.
Ryan, John Patrick; and Hart, Jack B., to Marion County Muscular Dystrophy Foundation. Pivotable and extendable apparatus for lifting a person to and from a vehicle. 4,015,725, Cl. 214-75.00R.
Ryashentsev, Nikolai Pavlovich: *See—*
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.
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Rogova, Svetlana Tanovna; Pikunov, Mikhail Vladimirovich; Kuptsova, Alla Ivanovna; Obukhova, Galina Zakharovna; Karalnik, Dmitry Mikhailovich; and Rybakov, Anatoly Ivanovich, 4,015,981.
Saeki, Keiso; and Matsukawa, Hiroharu, to Fuji Photo Film Co., Ltd. Process for hardening microcapsules. 4,016,098, Cl. 252-316.000.
Sagami Chemical Research Center: *See—*
Kondo, Kiyosi; Terada, Osamu; Oshima, Kohei; Mori, Yasuki; and Mochida, Kenichi, 4,016,186.
Sahasrabudhe, Arun P.; and Matty, Thomas C., to Westinghouse Electric Corporation. Signal bandpass filter apparatus. 4,016,517, Cl. 333-71.000.
Sahm, Peter R.; and Nicoll, Andrew R., to BBC Brown Boveri & Company Limited. High temperature alloy. 4,016,014, Cl. 148-32.000.
Said Sami I.; Mutt, Viktor; and Nilsson, Ann. Vasoactive intestinal peptide from fowl. 4,016,258, Cl. 424-177.000.
St. Amand, Elmer F.; and Thornbury, Thomas R., to American Hospital Supply Corporation. Method of forming closure system for medical liquid container. 4,015,401, Cl. 53-29.000.
Saint-Gobain Industries: *See—*
Levecque, Marcel; Battigelli, Jean A.; and Plantard, Dominique, 4,015,963.
Levecque, Marcel; Battigelli, Jean A.; and Plantard, Dominique, 4,015,964.
St. John, Richard C.: *See—*
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Saito, Katashi; Kawakami, Kiminari; and Ishiguro, Moriyuki, to Nippon Kokan Kabushiki Kaisha. Mold for continuous casting process. 4,015,982, Cl. 75-156.500.
Saito, Takuya: *See—*
Ishida, Nakao; Kitame, Fumio; Utsushikawa, Kuniko; Kohama, Tomoaki; Saito, Takuya; and Kikuchi, Mikio, 4,016,256.
Sakaguchi, Yasuhiro; Koike, Junichi; and Kubo, Takehisa, to Daicel, Ltd. Spirally-wound membrane-type separator module capable of reversing the direction of liquid flow. 4,016,083, Cl. 210-433.00M.
Sakai, Takeyo: *See—*
Matsuda, Kazuo; Ohmura, Hidemasa; and Sakai, Takeyo, 4,016,120.
Matsuda, Kazuo; Ohmura, Hidemasa; and Sakai, Takeyo, 4,016,121.
Matsuda, Kazuo; Ohmura, Hidemasa; and Sakai, Takeyo, 4,016,122.
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Budker, Gersh Itskovich; Gaponov, Vasily Alexandrovich; Korabelnikov, Boris Mikhailovich; Krainov, Gennady Sergeevich; Kuznetsov, Sergei Alexandrovich; Kuksanov, Nikolai Konstantinovich; Kondratiev, Vasily Ivanovich; and Salimov, Rustam Abelevich, 4,016,499.
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Sam Stein Associates, Inc.: *See—*
Booth, Raymond E., 4,016,299.
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Beaty, Thomas, Jr.; and Samander, Asib S., 4,015,732.
Samorodov, German Ivanovich; Loiko, Evgeny Nikolaevich; Olshevsky, Orest Viktorovich, deceased; by Olshevskaya, Valentina Mikhailovna, administrator; by Olshevsky, Alexandr Orestovich, administrator; by Olshevsky, Viktor Alexandrovich, administrator; and by Olshevskaya, Nina Alexandrovna, administrator. Arrangement for limiting dynamic overvoltages. 4,016,485, Cl. 323-101.000.
Samuelson, Hans Olof, to Mo och Domsjo Aktiebolag. Process for delignifying and bleaching cellulose pulp. 4,016,029, Cl. 162-31.000.
Sanders Associates, Inc.: *See—*
Arkind, Kenneth D.; and Geddry, Bernard L., 4,016,570.
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Sassenroth, Karl-Wilhelm: *See—*
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Sasson, Eli. Perpetual calendar. 4,015,351, Cl. 40-110.000.
Sato, Akihiko; and Nakano, Yoshiyuki, to Nippon Kogaku K.K. Shutter charge device for lens shutter in a camera having a focal plane shutter and permitting lens interchange. 4,016,584, Cl. 354-295.000.
Sato, Koitsu: *See—*
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Sato, Mitsuo: *See—*
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Sato, Toshiaki, to Unitika Ltd. Transfer system. 4,015,536, Cl. 104-88.000.
Satomi, Takeo; Hino, Naganori; Tateishi, Koshi; Hirano, Masachika; Mukai, Kunio; Nodera, Katsuji; and Sasaki, Mitsuru, to Sumitomo Chemical Company, Limited. Amido phosphorothiolates. 4,015,974, Cl. 71-87.000.
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Saucy, Gabriel: *See—*
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Sauter, Walter A.; and Martin, David R., to American Nucleonics Corporation. Reflective signal controller. 4,016,516, Cl. 333-81.00R.
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Sawyer, Willard H.; and Duncan, Michael T., to Exxon Research and Engineering Company. Preparation of catalysts of predetermined pore size distribution and pore volume. 4,016,106, Cl. 252-455.00R.
Sawyer, Willard H.; and Robson, Harry E., to Exxon Research and Engineering Company. Preparation of catalysts of predetermined pore size distribution and pore volume. 4,016,107, Cl. 252-455.00R.

Saxena, Brij B., to Cornell Research Foundation, Inc. Method for testing for pregnancy. 4,016,250, Cl. 424-1.000.
Scandril Offshore, Inc.: *See*—
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Schaaf, Robert: *See*—
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Schaafsma, Sijbrandus E.; and Geurts, Leonardus H., to Stamicarbon B.V. Preparation of a 2-amino-pyrroline derivative. 4,016,175, Cl. 260-326.620.
Schaefer Equipment Company: *See*—
Cale, Roland E., 4,015,697.
Schaefer, Helmut. Layer composition. 4,016,326, Cl. 428-306.000.
Schaller, Helmut F. K. Injection molded stick for stringed musical instrument bow. 4,015,501, Cl. 84-282.000.
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Schawinsky, Terry Kyle; Strobl, Walter; and Polkinghorn, Melvin William, to International Telephone and Telegraph Corporation. Turn signal and hazard warning control apparatus for unitary insertion into vehicle steering column body. 4,016,380, Cl. 200-61.270.
Scheinecker, Alois; and Holleis, Gunter, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Strand guiding means for guiding a strand continuously cast in a continuous casting plant. 4,015,656, Cl. 164-282.000.
Scheler, Holger, to Hagenuk vormals Neufeldt & Kuhnke GmbH. Programmable device for mechanically executing work processes. 4,015,721, Cl. 214-1.0BB.
Schenectady Chemicals, Inc.: *See*—
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Schering Aktiengesellschaft: *See*—
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Schering Corporation: *See*—
Zitowitz, Lester; Walter, Lewis A.; and Wohl, Arnold J., 4,016,291.
Schiel, Christian; Egelhof, Dieter; and Wolf, Karl, to J. M. Voith GmbH. Distribution means for aqueous slurry in papermaking machines. 4,016,033, Cl. 162-343.000.
Schiessl, Alois; and Krone, Hartmut, to Buck K.G., Firma. Incendiary projectile and manual launcher. 4,015,355, Cl. 42-1.00F.
Schinzel, Erich: *See*—
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Schirmer, Kurt Ernest. Upright wide angle stereo ophthalmoscope. 4,015,898, Cl. 351-6.000.
Schladitz, Hermann J. Heat pipe. 4,015,659, Cl. 165-105.000.
Schlage Lock Company: *See*—
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Schmaus, Siegfried H. A. Direct-acting pressure sensor. 4,015,478, Cl. 73-418.000.
Schmid, Rolyn A., to Bender Machine Works, Inc. Apparatus for automatically mixing and circulating cleaning solutions through dairy equipment. 4,015,618, Cl. 137-93.000.
Schmidt, Hans Heinrich, to Enor Nominees Pty. Limited. Method for progressively constructing a wall of cementitious material. 4,016,228, Cl. 264-33.000.
Schmidt, Norbert T. Round building with combined center support tube and flue structure. 4,015,381, Cl. 52-199.000.
Schnee, Karl; Tichy, Dieter; Michel, Walter; and Gruber, Gunter, to Cassella Farbwerke Mainkur Aktiengesellschaft. Melamine resin films prepared by impregnating of paper, cellulose, fleece or fabric. 4,016,336, Cl. 428-530.000.
Schneider, Herbert: *See*—
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Schnell, William J.: *See*—
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Schober, Franz, to Bayerische Leichtmetallwerk Graf Bluecher von Wahlstatt KG. Closed drop forging die. 4,015,461, Cl. 72-358.000.
Schoeller & Co. Elektrotechnische Fabrik: *See*—
Seibel, Georg; and Ante, Gunther, 4,016,400.
Schoonover, Philip C.; and Maltz, Martin S., to Xerox Corporation. Method of erasing manifold images. 4,015,983, Cl. 96-1.00M.
Schorwerth, Mathias: *See*—
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Schreiber, Gus. Blood transfusion filters. 4,016,077, Cl. 210-77.000.
Schreiber, Wolfgang, to Henkel & Cie G.m.b.H. Process for the recovery of proteins from aqueous solutions of proteins. 4,016,039, Cl. 195-66.00R.
Schrewelius, Nils G., to Bulten-Kanthal Aktiebolag. Heat resistant material. 4,016,313, Cl. 428-35.000.
Schrinner, Elmar: *See*—
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Schrock, Wilfried: *See*—
Konig, Hans-Bodo; Schrock, Wilfried; Disselnkotter, Hans; and Metzer, Karl Georg, 4,016,282.
Schroder, Peter, to Albert-Frankenthal AG. Device for testing sheets delivered from a folding apparatus associated with rotary printing presses. 4,015,840, Cl. 271-64.000.
Schroer, Richard A.: *See*—
Rajadhyaksha, Vithal J.; Schroer, Richard A.; Brock, Phillip J.; and Krueger, Earl R., 4,016,223.
Schroter, Herbert: *See*—
Jaeggi, Knut A.; Ostermayer, Franz; and Schroter, Herbert, 4,016,283.
Schuimer, Jan P.: *See*—
Mensink, Cor A.; and Schuimer, Jan P., 4,015,609.
Schulein, Joseph. Vehicle display assembly. 4,015,557, Cl. 116-42.000.
Schulz, Johann G. D.: *See*—
Onopchenko, Anatoli; and Schulz, Johann G. D., 4,016,206.
Schumacher, Frank A., to General Electric Company. Household refrigerator having a door cooling apparatus. 4,015,442, Cl. 62-449.000.
Schumacher, Gunter; Tef, Peter; and Wiester, Max, to R. Stahl Aufzuege GmbH. Shock absorbers for elevators. 4,015,835, Cl. 267-124.000.
Schuss, Jack A., to Combustion Engineering, Inc. Distributed programmable control system. 4,015,548, Cl. 110-101.00C.
Schuurs, Antonius H. W. M.; Van Weemen, Bauke K.; and Wolters, Gerrit, to Akzona Incorporated. Enzymatic immunological method for the determination of antigens and antibodies. 4,016,043, Cl. 195-103.50R.
Schuyler, Peter B.: *See*—
Blodgett, Fredrick M., Jr.; and Schuyler, Peter B., 4,015,508.
Scott, Chester A. Tiltable headboard. 4,015,298, Cl. 5-327.00B.
Scott, Kenneth W. Water heater control system. 4,016,402, Cl. 219-334.000.
Scott, Lyndell F.: *See*—
Cook, Thomas W.; Penner, Wayne A.; Quaglino, Carl A.; Ray, Charles D.; and Scott, Lyndell F., 4,016,531.
Scott, William R. Color displaying fatigue sensor. 4,015,465, Cl. 73-91.000.
Scranton Manufacturing Company, Inc.: *See*—
Wright, Harold G.; and Gordon, Richard J., 4,015,737.
Scriabine, Alexander; and Stone, Clement A., to Merck & Co., Inc. Compositions and method of treating hypertension. 4,016,288, Cl. 424-309.000.
Seager, Harry, to Beecham Group Limited. Pharmaceutical formulations. 4,016,254, Cl. 424-33.000.
Sears, James H.; and Holloway, James Newton, Jr., to Owens-Corning Fiberglas Corporation. Apparatus for coating continuously produced filaments. 4,015,559, Cl. 118-259.000.
Sedlak, Joseph, to Lawrence Peska Associates, Inc., a part interest. Fishing lure. 4,015,363, Cl. 43-42.220.
Seibel, Georg; and Ante, Gunther, to Schoeller & Co. Elektrotechnische Fabrik. Overheating safety device for electrical lighters. 4,016,400, Cl. 219-264.000.
Seiko Koki Kabushiki Kaisha: *See*—
Kitai, Kiyoshi; Ogihara, Masuo; Sato, Kouzo; and Shinozaki, Nobuo, 4,015,417.
Seki, Masao, to Tokyo Gas Company Limited. Method for controlling the capacity of a blower and a device for controlling the pressure in a liquefied gas storage tank utilizing said method. 4,015,436, Cl. 62-48.000.
Sekiya, Fukuo: *See*—
Morokawa, Shigeru; and Sekiya, Fukuo, 4,016,476.
Selmeczi, Joseph G.; Marlin, Donald H.; and Kestner, Daniel W., to Dravo Corporation. Process for stabilizing aqueous coal sludges. 4,015,997, Cl. 106-287.00R.
Semon, Albert L. Rotary plug valve. 4,015,816, Cl. 251-285.000.
Sengewald, Karl Heinz. Packaging bag of thermoplastic synthetic plastic film. 4,015,771, Cl. 229-62.000.
Senn, Werner: *See*—
Engel, Walter; Senn, Werner; and Steinemann, Max, 4,015,534.
Sentrol Systems Ltd.: *See*—
De Remigis, Joseph, 4,015,904.
Serlin, Irving; and Markhart, Albert H., to Monsanto Company. Preparation of aqueous solutions of quaternary ammonium resins from di(tertiary amine) and 1,4-dihalobutene-2. 4,016,128, Cl. 260-29.6HN.
Setina, John R. Vertical sliding automobile partition having curved track mounted on front of shield plate. 4,015,875, Cl. 296-24.00R.
Severin, Ernest O., to Aquasol, Inc. Automatic chlorine and pH control apparatus for swimming pools. 4,016,079, Cl. 210-96.00R.
Sevigny, George D.: *See*—
Reible, George A., Jr.; and Sevigny, George D., 4,016,479.
Seybold, Joseph F. Thermal limiter. 4,016,521, Cl. 337-241.000.
Shakley, Conrad Dale: *See*—
Goffredo, Daniel L.; and Shakley, Conrad Dale, 4,015,706.
Shapiro, Eugene: *See*—
Winter, Joseph; Shapiro, Eugene; and Smith, Warren F., 4,015,459.
Shapiro, Stanley: *See*—
Caron, Ronald N.; and Shapiro, Stanley, 4,016,010.
Shappir, Joseph, to U.S. Philips Corporation. Semiconductor device and method of manufacturing the device. 4,016,594, Cl. 357-41.000.
Sharon, Uzi, to Laser Industries, Ltd. Method and apparatus for aligning an invisible beam particularly a laser bear. 4,015,906, Cl. 356-138.000.
Sharp, Larry Lee, to Illinois Tool Works Inc. Thermal switch device and method of making. 4,016,522, Cl. 337-403.000.
Shaw, Clarence W., to J. Ray McDermott & Co., Inc. Marine pipelaying apparatus. 4,015,435, Cl. 61-108.000.

Shell Oil Company: *See—*
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Womack, Fred A.; and Jahns, Daniel F., 4,015,469.

Sheller-Globe Corporation: *See—*
Dinlocker, Robert I., 4,016,535.

Shen, Tsung-Ying: *See—*
Wagner, Arthur F.; and Shen, Tsung-Ying, 4,016,209.

Shenoha, James L., to Norwood Marking & Equipment Company. Imprinter and actuator therefor. 4,015,525, Cl. 101-333.000.

Shepard, Henry M. Sawmill. 4,015,648, Cl. 144-326.00R.

Shepherd, Freeman D., Jr.; and Roosild, Sven A., to United States of America, Air Force. Phase compensated zone plate photodetector. 4,016,416, Cl. 250-211.00J.

Sherer, Paul, to Xerox Corporation. Anti-shouldering read circuit for magnetic disk memory. 4,016,599, Cl. 360-53.000.

Sheridan, Francis R. Magnetically activated oscillatory motor. 4,016,439, Cl. 310-39.000.

Sherman, Viktor Lvovich: *See—*
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.

Shiba, Keisuke; Hirose, Takeshi; Hayashi, Jun; and Aono, Toshiaki, to Fuji Photo Film Co., Ltd. Multilayer color photographic light-sensitive material. 4,015,988, Cl. 96-69.000.

Shibata, Mituo. Method for settling anchoring device in the ground. 4,015,433, Cl. 61-53.600.

Shida, Mitsuzo: *See—*
Hoff, Raymond E.; and Shida, Mitsuzo, 4,016,343.

Shija, Makoto: *See—*
Kudo, Teizo; Hashizume, Yoshio; Itoh, Masanori; and Shiga, Makoto, 4,016,221.

Shimizu, Akihiko; and Hayashi, Takao, to Toyo Soda Manufacturing Co., Ltd. Stabilizing 2,3-dichloro-1,3-butadiene with certain N-nitrosoaniline compounds. 4,016,216, Cl. 260-652.50P.

Shimp, Alan B.: *See—*
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Shin-Etsu Chemical Company Limited: *See—*
Ogawa, Kinya; Kurimoto, Kazuhiko; Eguchi, Yoshitsugu; and Kuwata, Satoshi, 4,016,341.

Shinano, Takayuki: *See—*
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Shinko Electric Co., Ltd.: *See—*
Abe, Eiji; Ohta, Takahisa; and Urata, Mitsuharu, 4,016,406.

Shinohara, Sakuta. Combustion engine with dual function motor element and rotary valve for cyclical fuel and exhaust metering. 4,015,424, Cl. 60-39.600.

Shinozaki, Nobuo: *See—*
Kitai, Kiyoshi; Ogihara, Masuo; Sato, Kouzo; and Shinozaki, Nobuo, 4,015,417.

Shiraiwa, Masatoyo; Tokumitsu, Ichiro; Takemura, Toshisada; Hatano, Satoshi; and Yamaguchi, Hiroshi, to Idemitsu Sekiyukagaku Kabushiki Kaisha (Idemitsu Petrochemical Co., Ltd.). Method for rapid cooling of thermally cracked gases of hydrocarbons and apparatus for carrying out the method. 4,016,066, Cl. 208-48.00Q.

Shoh, Andrew, to Branson Ultrasonics Corporation. Sonic or ultrasonic processing apparatus. 4,016,436, Cl. 310-8.200.

Sholly, William C., Jr., to Warner & Swasey Textile Machine Company, The. Monitored twist control apparatus and method. 4,015,414, Cl. 57-34.0HS.

Shonkwiler, Forest M. Convertible adjustable tilting bed for vehicles. 4,015,879, Cl. 298-14.000.

Shore, Daniel B.; and Chatterjea, Probir K., to International Harvester Company. Clutch-brake steering mechanism for tractors. 4,015,619, Cl. 137-102.000.

Shore, Daniel B.; and Duke, Edward D., to International Harvester Company. Ground driven hydraulic emergency steering system. 4,015,681, Cl. 180-133.000.

Shoults, Royland D.; and Yost, Robert S., to Rohm and Haas Company. Compounds containing nitrogen and fluorine. 4,016,199, Cl. 260-486.00H.

Showa Denko Kabushiki Kaisha: *See—*
Matsushima, Tomoo; Odajima, Tsutou; Tsuruki, Junzo; and Yoshida, Yasuo, 4,015,978.

Shutt, Thomas Clifford; and Snider, L. Wayne, to Vitrofil Corporation. Preparation of unsaturated polyester compositions. 4,016,131, Cl. 260-40.00R.

Siden, Lars, to Akustik Miljo AB. Device for latching a door in a pre-determined position or rotation. 4,015,867, Cl. 292-262.000.

Siden, LeRoy E.: *See—*
Slysh, Paul; and Siden, LeRoy E., 4,015,653.

Sidor, Edward Frank, to Illinois Tool Works Inc. Thermal switch device. 4,016,523, Cl. 337-403.000.

Sieger, George Madison; Krueger, James Elwood; Osterberg, Arnold Curtis; and Tedeschi, David Henry, to American Cyanamid Company. Sustained release forms of certain oxazepines for parenteral administration. 4,016,273, Cl. 424-250.000.

Siemens Aktiengesellschaft: *See—*
Dietze, Wolfgang; Reuschel, Ronrad; and Kasper, Andreas, 4,015,922.

Sigma-Tau Industrie Farmaceutiche/Riunite S.p.A.: *See—*
Cavazza, Claudio, 4,015,758.

Signode Corporation: *See—*
Cheung, Nelson, 4,015,643.

Silva, John; Garrett, Robert A.; Borkat, Franklin R.; and Young, Frank, to United States of America, Navy. Automatic patient weighing system. 4,015,677, Cl. 177-165.000.

Silver, Robert L.; and Eisenhut, Bert R., to Triple E Corporation. Material handling box having a side hopper and door. 4,015,714, Cl. 206-511.000.

Silver Seiko Co., Ltd.: *See—*
Kagaya, Yutaka, 4,015,446.

Simon, Francois. Device for the measurement of the radial force sustained by a rotary organ. 4,015,468, Cl. 73-136.00R.

Simon, Henri J. H.: *See—*
Bonnema, Jentje; and Simon, Henri J. H., 4,015,946.

Simons, John R.; and Fenske, John W., to Grunau Company, Inc. Concealed sprinkler head. 4,015,665, Cl. 169-40.000.

Sines, Randy D. Automatic cue ball separating and return assembly for billiard tables. 4,015,845, Cl. 273-11.00C.

Singer Company, The: *See—*
Herr, John Addison; Jaffe, Wolfgang; Dob, Allan Matthew; Minalga, Philip Francis; Adams, Kenneth Douglas; and Herron, William Lee, 4,016,441.
Kahan, William; and Peer, Thomas Richard, 4,015,445.
Masselle, Francis L., 4,015,342.
Orth, Charles D.; and Griffoul, Marcel P., 4,015,776.
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Sinloihi Co.: *See—*
Hyosu, Yoshihiko; Miyashita, Eiiti; Kuzuba, Noboru; Miyahara, Sadayasu; and Takano, Ryoshiro, 4,016,133.

Sitkewich, W. Jorge, to Fischer & Porter Co. Linear displacement transducer. 4,015,477, Cl. 73-398.00R.

Siverson, Lilian Ellen. Recording sphygmomanometer sphygpressure graph. 4,015,594, Cl. 128-2.05G.

SKF Industrial Trading and Development Company, B.V.: *See—*
Taylor, Geoffrey, 4,015,883.

Slavik, Valter; and Meisser, Marc, to Heberlein & Co. AG. Bobbin changing apparatus. 4,015,786, Cl. 242-35.50A.

Slivenko, Victor: *See—*
Bokros, Jack C.; and Slivenko, Victor, 4,015,601.

Slysh, Paul; and Siden, LeRoy E., to General Dynamics Corporation. Panel deployment system. 4,015,653, Cl. 160-213.000.

Small, Edward A.; Edwards, Richard H.; Eufusia, Eugene A.; Clary, Robert M.; and Bergfelt, Nils H., to Optical Coating Laboratory, Inc. Vapor deposition apparatus. 4,015,558, Cl. 118-6.000.

Smith, Edwin Studley; and Marshall, Richard A., to Goodyear Tire & Rubber Company, The. Reduction of vinyl chloride in free space surrounding polyvinyl chloride powder. 4,016,350, Cl. 528-486.000.

Smith, Fred, to Anglian Water Authority. Process and apparatus for forming silicate products. 4,016,097, Cl. 252-313.00S.

Smith, Oliver Wendell: *See—*
Trecker, David John; Borden, George Wayne; and Smith, Oliver Wendell, 4,016,059.

Smith, Palmer L. Hay or crop saving attachment for mobile pick-up baler. 4,015,410, Cl. 56-364.000.

Smith, Warren F.: *See—*
Winter, Joseph; Shapiro, Eugene; and Smith, Warren F., 4,015,459.

Smith, William Van. Stabilizer mechanism. 4,015,856, Cl. 280-446.00B.

Snam Progetti S.p.A.: *See—*
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Snider, L. Wayne: *See—*
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Snijders, Mathieu Willem Maria: *See—*
Collaris, Maria Antonius Alphonsus Andreas; van Kemenade, Antonius Wilhelmus Cornelis; Debruijn, Henricus Antonius; and Snijders, Mathieu Willem Maria, 4,016,307.

Snook, Phillip D.: *See—*
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Soares, James R., to Biological Developments, Inc. Phenethylamine antigenic conjugates, their preparation, antibodies, and use. 4,016,146, Cl. 260-112.00R.

Sobota, John T., to Fort Howard Paper Company. Calendering paper containing thermoplastic contaminants. 4,016,030, Cl. 162-199.000.

Societe Anonyme a Responsabilite Limitee: Technifil: *See—*
Beretta, Oscar, 4,015,743.

Societe d'Assistance Technique Pour Produits Nestle S.A.: *See—*
Hsu, Jau Yann, 4,016,337.

Societe d'Etudes et de Construction de Materiel Electronique S.E.C.M.E.: *See—*
Delaage, Jacques Jean, 4,016,401.

Societe d'Etudes et de Realisations Industrielles: *See—*
Lefeuvre, Antoine Augustin Joseph, 4,016,076.

Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM): *See—*
Bourree, Guy; and Pontier, Claude, 4,015,807.
Gillet, Roger, 4,016,444.

Societe Metallurgique Le Nickel SLN: *See—*
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Societe Miniere et Metallurgique de Penarroya: *See—*
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Sodhi, Satwant S.: *See—*
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Soffge, Friedhelm: *See—*
Eyb, Wolfgang; Soffge, Friedhelm; Piper, Ortwin; and Albrecht, Gerhard, 4,015,303.

Sokol, Charles S.: *See—*
Steigelmann, Edward F.; and Sokol, Charles S., 4,015,955.

Sokolow, Nickolas N., to Beloit Corporation. Heating and stratification device for an injection molding machine. 4,015,916, Cl. 425-242.00R.

Solar, Serge: *See—*
Gandon, Louis; Jean, Roger; and Solar, Serge, 4,016,055.
Solie, Leland P., to Sperry Rand Corporation. Surface wave convolver apparatus. 4,016,513, Cl. 333-30.00R.
Sommer, Neithart; Cuntze, Gerhard; and Boehmer, Wolfgang, to Chemische Werke Huls Aktiengesellschaft. Process for the production of polymers having a broad molecular weight distribution. 4,016,347, Cl. 526-64.000.
Sommerville, S. Smith. Liquid-fuel vaporizer. 4,015,570, Cl. 123-133.000.
Sonderegger, Hans C.: *See—*
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Sonnet, Gunther, to Jos. Schneider & Co. Reflecting-lens objective. 4,015,896, Cl. 350-201.000.
Sonntag, Alain: *See—*
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Sony Corporation: *See—*
Tokumoto, Shin-Ichi; Tanaka, Eiji; Ogisu, Kenji; and Kawai, Hiroji, 4,016,052.
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Soodak, Charles I.: *See—*
Macemon, James H.; and Soodak, Charles I., 4,016,491.
Sousamian, William; and Filisky, John J., Jr., to Sousamian, William. Actuating mechanism for pressurized fluid brake system and fail-safe locking device therefor. 4,015,698, Cl. 188-265.000.
Southern Pacific Land Co.: *See—*
Wilkins, Vernon H., 4,016,075.
Sowa, Tsuneo: *See—*
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Spence-Bate, Harry Arthur Hele. Photographic film positioning mechanism. 4,015,901, Cl. 355-53.000.
Spencer, Harvey J., to Paper Converting Machine Company. Method and apparatus for handling substacks of business forms to develop balanced stacks. 4,015,724, Cl. 214-6.500.
Sperry Rand Corporation: *See—*
Law, Wendell A.; Barrett, William G.; Priebe, Norman F.; and Wise, Harry D., 4,016,367.
Law, Wendell A.; Barrett, William G.; Priebe, Norman F.; and Wise, Harry D., 4,016,548.
Solie, Leland P., 4,016,513.
Spiral-Craft: *See—*
Dean, Robert, 4,015,687.
Spooner, Robert J.; and Dillon, Oscar W., to Cashin Systems Corporation. Cold cut slicing system. 4,015,494, Cl. 83-76.000.
Sprague Electric Company: *See—*
Maher, John P.; and Johnson, Theodore W., 4,016,525.
Sprecher & Schuh AG: *See—*
Roth, Adrian W., 4,016,382.
Square D Company: *See—*
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Sta-Rite Industries, Inc.: *See—*
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Staar Development Company, S.A.: *See—*
Staar, Marcel Jules Helene, 4,016,365.
Staar, Marcel Jules Helene, to Staar Development Company, S.A. Readout for recording typewriter. 4,016,365, Cl. 178-23.00R.
Stach, Kurt, deceased: *See—*
Fauland, Erich; Kampe, Wolfgang; Stach, Kurt, deceased; Plattner, Werner, executor; Stork, Harald; and Dietmann, Karl, 4,016,262.
Stadler, Bertold. Electronic protection for power amplifier. 4,016,460, Cl. 330-207.00P.
Stahle, Helmut: *See—*
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, 4,016,202.
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, 4,016,286.
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Standard Oil Company: *See—*
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Steigelmann, Edward F.; and Sokol, Charles S., 4,015,955.
Standard Oil Company (Indiana): *See—*
Craig, James T., Jr.; and Park, Arthur, 4,015,673.
Lewis, Harry R., Jr., 4,015,660.
Stanev, Tzvyatko Penchev, to DSO "Bulgarski Darjavni Jeleznitzi". Method of measuring a railway-vehicle load. 4,015,675, Cl. 177-1.000.
Stankovich, Ivan D.; and Louchis, Stavros D., to Kaiser Aluminum & Chemical Corporation. Feeding particulate matter. 4,016,053, Cl. 204-67.000.
Stankowitz, Arthur J. Platform support structure. 4,015,543, Cl. 108-27.000.
Stanley Tools Limited: *See—*
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Stanley Works, The: *See—*
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Stanton, William: *See—*
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Star Dental Manufacturing Co., Inc.: *See—*
Lieb, Nathaniel H.; Kerfoot, Franklin W., Jr.; and Wallace, Richard A., 4,015,489.
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Starlite Chemicals, Inc.: *See—*
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Stauffer Chemical Company: *See—*
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Stauffer, William O., to Kaiser Aluminum & Chemical Corporation. Beneficiation of metal scrap. 4,016,003, Cl. 134-19.000.
Stcherbatcheff, Georges; and Lefeuvre, Andre, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Front protection device for motor vehicles. 4,015,870, Cl. 293-32.000.
Stedman, Robert N.: *See—*
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Steel, Francis Robert: *See—*
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Jasinski, Leon; and Steel, Francis Robert, 4,016,501.
Steidley, Roy B.: *See—*
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Steigelmann, Edward F.; and Sokol, Charles S., to Standard Oil Company. Fluid separation process and membrane. 4,015,955, Cl. 55-16.000.
Steinemann, Max: *See—*
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Stenert, Alois, to Hoesch Werke Aktiengesellschaft. Anti-friction bearing. 4,015,882, Cl. 308-1.00A.
Stenkvist, Sven-Einar, to ASEA AB. Device in direct current arc furnaces. 4,016,355, Cl. 13-11.000.
Stenzel, Wallace I.; Kufrin, Frederick W.; and Allen, Donald J., to Waukee Engineering Co. Firecheck. 4,015,953, Cl. 48-192.000.
Stern, Ernest; and Williamson, Richard C., to Massachusetts Institute of Technology. Surface wave devices for processing signals. 4,016,412, Cl. 235-181.000.
Stern, Sidney Simon, to Stauffer Chemical Company. Cooling process for subambient and above ambient temperatures. 4,015,439, Cl. 62-114.000.
Sterr, Horst: *See—*
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Stevens, William M., to Hill-Rom Company, Inc. Pulsing ground-test circuit. 4,016,488, Cl. 324-51.000.
Stick, Philip P.; Willenbecher, James F.; and Armstrong, Lee R., to United Technologies Corporation. Determination of number of teeth on an internal combustion engine flywheel. 4,015,466, Cl. 73-116.000.
Stirling, John Andrew: *See—*
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Stiso, Sisto Nicholas: *See—*
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Stolzer, Paul, to KEURO Maschinenbau Gesellschaft mit beschrankter Haftung & Co., Kommanditgesellschaft. Bow saw machine. 4,015,500, Cl. 83-755.000.
Stone, Clement A.: *See—*
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Stone, Robert Porter, to RCA Corporation. Method of setting cathode-G1 spacing. 4,015,315, Cl. 29-25.160.
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Stromberg-Carlson Corporation: *See—*
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Strong, Jack C. Pick for string instruments. 4,015,502, Cl. 84-322.000.
Strong, Walker Albert, to PPG Industries, Inc. Hydrogen peroxide stabilization with 3-n-morpholinylpropionitriles. 4,016,243, Cl. 423-272.000.
Strubhar, Malcolm K., to Mobil Oil Corporation. Method of subterranean steam generation by in situ combustion of coal. 4,015,663, Cl. 166-258.000.
Struble, Dale L., to Union Products, Incorporated. Latching assembly for cap door. 4,015,454, Cl. 70-2.000.
Stubbmann, Albert, to Kohner, Inc. Child's toy. 4,015,365, Cl. 46-47.000.
Stumpp, Gerhard, to Robert Bosch G.m.b.H. Fuel-air mixture controller for internal combustion engines. 4,015,571, Cl. 123-139.0AW.
Sudderth, R. Brantley: *See—*
MacKay, Kenneth D.; and Sudderth, R. Brantley, 4,015,980.
Sueda, Noriyoshi: *See—*
Kogure, Katsura; Sueda, Noriyoshi; Himoto, Sizuo; Yoshino, Youziro; and Nakagawa, Kunio, 4,016,196.

Sugano, Takuo; and Mori, Yoshifumi, to Hayashi, Kentaro, President, University of Tokyo. Compound semiconductor optical integrated circuit having isolation zones for light transmission. 4,015,893, Cl. 350-96.0WG.

Suggitt, Robert M.: *See—*
Knifton, John F.; and Suggitt, Robert M., 4,016,194.

Sugimoto, Kaname; Hirao, Mamoru; Kurimoto, Masashi; and Miyake, Eikichi, to Hayashibara Company. Process for preparing maltoses from starches. 4,016,038, Cl. 195-31.00R.

Sugita, Yoshimitsu: *See—*
Yoshinaka, Akira; Aoshima, Takaaki; and Sugita, Yoshimitsu, 4,016,006.

Sugiyama, Atsushi: *See—*
Kajiura, Atsusuke; Aito, Yuzo; Sugiyama, Atsushi; Tamura, Hiroki; and Aihara, Kazuma, 4,016,112.

Suiker Unie Holding B.V.: *See—*
Hoks, Dirk, 4,016,001.

Sumitomo Chemical Company, Limited: *See—*
Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, 4,016,179.
Satomi, Takeo; Hino, Naganori; Tateishi, Koshi; Hirano, Masachika; Mukai, Kunio; Nodera, Katsuji; and Sasaki, Mitsuru, 4,015,974.

Summers, Cherry Sue. Baby walker enclosure. 4,015,853, Cl. 280-87.02W.

Superior Electric Company, The: *See—*
Leenhouts, Albert C., 4,016,472.

Superior Valve Company: *See—*
Kongelka, Robert M., 4,015,865.

Susa, Kenzo; Kobayashi, Toshio; Taniguchi, Satoshi; and Ishii, Mitsuru, to Hitachi, Ltd. Process for production of cubic boron nitride. 4,016,244, Cl. 423-290.000.

Sutton, Charles W.: *See—*
Revells, Robert G.; Olson, Earl J.; and Sutton, Charles W., 4,015,968.

Suzuei Co. Ltd: *See—*
Ahiko, Isami, 4,015,431.

Suzuki, Akira; Miura, Hiroshi; Matsuda, Saburo; and Ohsawa, Takashi, to Tanabe Seiyaku Co., Ltd. Method of preparing a controlled release liquid pharmaceutical composition. 4,016,100, Cl. 252-316.000.

Suzuki, Fred K.; and Davison, Thomas W., to Liquid Crystal Products, Inc. Cholesteric liquid crystalline phase material-dye composition and venapuncture method employing the composition. 4,015,591, Cl. 128-2.00R.

Suzuki, Hiroshi: *See—*
Nagasawa, Keisaku; Mitsuishi, Masashi; Suzuki, Hiroshi; and Matsushita, Tetsuo, 4,016,236.

Suzuki, Shigeto, to Chevron Research Company. Acid production. 4,016,208, Cl. 260-535.00R.

Suzuki, Yasuhide: *See—*
Okura, Rikuo; and Suzuki, Yasuhide, 4,015,573.

Svendsen, Lars Gundro, to Pentapharm A.G. Substrate for the quantitative determination of enzymes. 4,016,042, Cl. 195-103.50R.

Swain, Stephen C.: *See—*
Richardson, James E.; and Swain, Stephen C., 4,015,717.

Swerdling, Burton: *See—*
Vroom, Henry J.; Bolle, Warren Robert; Schneider, Herbert; and Swerdling, Burton, 4,015,586.

Swift and Company Limited: *See—*
Webb, Harry B.; Lee, James W.; and Blair, Robert B., 4,015,538.

Switzer, William P.; and Farrington, Daniel O., to Iowa State University Research Foundation, Inc. Vaccine for immunization of swine against *Bordetella bronchiseptica* infection and method of use. 4,016,253, Cl. 424-92.000.

Symmank, William D., to J. I. Case Company. Adjustable boom for material handling implement. 4,015,730, Cl. 214-141.000.

Szabo, Andras I.: *See—*
Zitelli, William E.; and Szabo, Andras I., 4,016,557.

Szabo, Marton J., to P.H.C. Industries, Inc. Sheathed soft-handle with concealed lapped ends. 4,016,315, Cl. 428-68.000.

Szatkowski, Richard R., deceased (Szatkowski, Richard X., administrator), to Szatkowski, Richard X. Disposable pallet. 4,015,544, Cl. 108-51.300.

Szatkowski, Richard X.: *See—*
Szatkowski, Richard R., deceased, 4,015,544.

Szatkowski, Richard X., administrator: *See—*
Szatkowski, Richard R., deceased, 4,015,544.

Szilagyi, Andrei; Hordvik, Audun; and Schlossberg, Howard Roy, to United States of America, Air Force. Apparatus for producing efficient second harmonic generation and frequency mixing. 4,016,427, Cl. 307-88.300.

Szymczak, Edward J., to Cameron Iron Works, Inc. Well apparatus. 4,015,864, Cl. 285-133.00A.

Tabata, Yasuhiro, to Ricoh Co., Ltd. Optical scanning system for slitwise exposure. 4,015,892, Cl. 350-6.000.

Takahashi, Masaaki; Ito, Akira; Kawawata, Shichiro; and Ogura, Jiro, to Kureha Kagaku Kogyo Kabushiki Kaisha. Radioactive ray-resistant stabilizer. 4,016,135, Cl. 260-45.70R.

Takahashi, Shigeru: *See—*
Wakabayashi, Yukimasa; and Takahashi, Shigeru, 4,016,305.

Takami, Masaho. Apparatus for automatically binding package. 4,016,023, Cl. 156-359.000.

Takano, Ryoshiro: *See—*
Hyosu, Yoshihiko; Miyashita, Eiiti; Kuzuba, Noboru; Miyahara, Sadayasu; and Takano, Ryoshiro, 4,016,133.

Takaya, Takao; and Masugi, Takashi, to Fujisawa Pharmaceutical Co., Ltd. 7-Dihaloalkanamido-3-heterocyclic-thiomethyl-3-cephem-4-carboxylic acids. 4,016,160, Cl. 260-243.00C.

Takematsu, Tetsuo: *See—*
Tamura, Saburo; Takematsu, Tetsuo; and Haruta, Hisae, 4,015,975.

Takemura, Toshisada: *See—*
Shiraiwa, Masatoyo; Tokumitsu, Ichiro; Takemura, Toshisada; Hatano, Satoshi; and Yamaguchi, Hiroshi, 4,016,066.

Takeuchi, Yasuhito, to Hewlett-Packard Company. Moving target detector. 4,016,528, Cl. 340-1.00R.

Tamai, Yasuo: *See—*
Dezawa, Shin-ichiro; and Tamai, Yasuo, 4,016,057.

Tamarin, Bernard J. Packaging. 4,015,770, Cl. 229-51.00C.

Tamura, Fumihide: *See—*
Mitsugi, Koji; Sano, Konosuke; Yokozeki, Kenzo; Yamada, Kazuhiko; Noda, Ichiro; Kagawa, Teruhiko; Eguchi, Chikahiko; Yasuda, Naohiko; Tamura, Fumihide; and Togo, Kazushi, 4,016,037.

Tamura, Hiroki: *See—*
Kajiura, Atsusuke; Aito, Yuzo; Sugiyama, Atsushi; Tamura, Hiroki; and Aihara, Kazuma, 4,016,112.

Tamura, Saburo; Takematsu, Tetsuo; and Haruta, Hisae, to Fujisawa Pharmaceutical Co., Ltd. Compositions containing alkyl 2-nitro-5-(2',4'-dichlorophenoxy)-thiobenzoates, and method of use thereof. 4,015,975, Cl. 71-100.000.

Tanabe Seiyaku Co., Ltd.: *See—*
Suzuki, Akira; Miura, Hiroshi; Matsuda, Saburo; and Ohsawa, Takashi, 4,016,100.

Tanaka, Eiji: *See—*
Tokumoto, Shin-Ichi; Tanaka, Eiji; Ogisu, Kenji; and Kawai, Hiroji, 4,016,052.

Taniguchi, Satoshi: *See—*
Susa, Kenzo; Kobayashi, Toshio; Taniguchi, Satoshi; and Ishii, Mitsuru, 4,016,244.

Tanimura, Shigeru; Miura, Nobuaki; and Asano, Osamu, to Omron Tateisi Electronics Co., Ltd. Semiconductor device. 4,016,589, Cl. 357-30.000.

Tannahill, Alex L.: *See—*
Finn, Robert K.; Tannahill, Alex L.; and Laptewicz, Joseph E., Jr., 4,016,085.

Tarrant, D. Jarratt, to Scandril Offshore, Inc. Leg and guide construction for use in jackup barges. 4,015,434, Cl. 61-91.000.

Tateishi, Koshi: *See—*
Satomi, Takeo; Hino, Naganori; Tateishi, Koshi; Hirano, Masachika; Mukai, Kunio; Nodera, Katsuji; and Sasaki, Mitsuru, 4,015,974.

Tawakol, A. Assem, to International Telephone and Telegraph Corporation. Valve with self-retaining valve seat. 4,015,818, Cl. 251-307.000.

Taylor, Daniel G., to Minneapolis War Memorial Blood Bank. Dual centrifuge and sample container. 4,015,774, Cl. 233-26.000.

Taylor, Geoffrey, to SKF Industrial Trading and Development Company, B.V. Annular sealing members and assemblies incorporating them. 4,015,883, Cl. 308-187.100.

Taylor, James A. Combined tape measure and marking device. 4,015,337, Cl. 33-138.000.

Taylor, Lloyd D.: *See—*
Kolesinski, Henry S.; Mehta, Avinash C.; and Taylor, Lloyd D., 4,016,340.

Taylor, Miller. Guide pulley for wide belts. 4,015,484, Cl. 74-230.300.

TEC Systems, Inc.: *See—*
Treleven, Robert E., 4,015,340.

Technicon Instruments Corporation: *See—*
Jay, Ronald Frank, 4,015,938.

Technisch Ontwikkelingsbureau van Elten B.V.: *See—*
van Elten, Gerrit Jan; and Hurkmans, Antonius, 4,015,519.

Tedeschi, David Henry: *See—*
Sieger, George Madison; Krueger, James Elwood; Osterberg, Arnold Curtis; and Tedeschi, David Henry, 4,016,273.

Tef, Peter: *See—*
Schumacher, Gunter; Tef, Peter; and Wiester, Max, 4,015,835.

Teijin Limited: *See—*
Kajiura, Atsusuke; Aito, Yuzo; Sugiyama, Atsushi; Tamura, Hiroki; and Aihara, Kazuma, 4,016,112.

Temple, Stephen. Kite with an improved rudder. 4,015,803, Cl. 244-153.00R.

Templeton, Kenly & Company: *See—*
Profet, Anthony G., 4,015,824.

Templeton, William B., to Burroughs Corporation. Apparatus for driving a document through an encoder station. 4,015,701, Cl. 197-127.00R.

Tennant, James R. Newspaper streamliner. 4,015,843, Cl. 271-240.000.

Terada, Osamu: *See—*
Kondo, Kiyosi; Terada, Osamu; Oshima, Kohei; Mori, Yasuki; and Mochida, Kenichi, 4,016,186.

Terasawa, Yoshio, to Hitachi, Ltd. Semiconductor controlled rectifier. 4,016,591, Cl. 357-38.000.

Terragnoli, John. Muffin slicer and perforator. 4,015,492, Cl. 83-2.000.

Texaco Development Corporation: *See—*
Marion, Charles P., 4,016,102.
Marion, Charles P., 4,016,103.
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Texaco Inc.: *See*—
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Texas Instruments Incorporated: *See*—
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Pandey, Kailash Narain, 4,016,361.
Wagers, Robert S., 4,016,440.
Textron, Inc.: *See*—
Flachbarth, Charles T.; and Myers, John L., 4,015,397.
Thakur, Babu N., to Engelhard Minerals & Chemicals Corporation. Bonded-abrasive wire saw. 4,015,931, Cl. 125-21.000.
Theimer, Ernst Theodore; and Heinze, George E., to Lectrofood, Inc. Electrically conducting foodstuff coated with composition of matter consisting essentially of gel and ionized species. 4,016,297, Cl. 426-90.000.
Theimer, Ernst Theodore; and Heinze, George E., to Lectrofood, Inc. Electrically conductible gellable composition with ionized salt. 4,016,301, Cl. 426-573.000.
Thenon, Christian; and Pelletier, Bernard, to Etablissements Carpano & Pons. Device for alternately winding flexible bands and the like between two rolls. 4,015,792, Cl. 242-67.400.
Theobald, Marvin G.; and Olson, Richard G., to National Can Corporation. Method and apparatus for securing inserts to containers. 4,015,325, Cl. 29-451.000.
Thies, Peter Willibrord, to Kali-Chemie Pharma GmbH. Esters of 4-hydroxy-2,9-dioxatricyclo[4.3.1.$0^{3,7}$] decanes and processes for their production. 4,016,176, Cl. 260-340.300.
Thill, Bruce P.; and Paige, Janet N., to Dow Chemical Company, The. Process for making 2-vinyl-2-oxazolines. 4,016,171, Cl. 260-307.00F.
Thill, Bruce P.: *See*—
Tomalia, Donald A.; Thill, Bruce P.; and Regulski, Thomas W., 4,016,192.
Thomas, Edward L. Fastener positioning device. 4,015,746, Cl. 221-263.000.
Thomas, John Henry, III: *See*—
Lesh, Nathan George, deceased; Merchants National Bank of Allentown, executor; Morabito, Joseph Michael; and Thomas, John Henry, III, 4,016,050.
Thompson, Neil Jay, to Johns-Manville Corporation. Ceiling system and prefabricated overhead building assembly using this system. 4,015,389, Cl. 52-475.000.
Thordarson, Inc.: *See*—
Thordarson, Petur, 4,015,626.
Thordarson, Petur, to Thordarson, Inc. Constant flow valve for low flow rates. 4,015,626, Cl. 137-375.000.
Thornbury, Thomas R.: *See*—
St. Amand, Elmer F.; and Thornbury, Thomas R., 4,015,401.
Thorstensson, Gustav Yngve: *See*—
Tisell, Claes-Gustav Erik Yngve; Lundell, Karl Erik Bjorn; Horner, Sven Henry Nilsson; Thorstensson, Gustav Yngve; and Karlstedt, Gustav Sven Erik, 4,015,860.
Thorud, Richard A.: *See*—
Witt, Robert H.; Horner, Herbert F., Jr.; and Thorud, Richard A., 4,015,406.
Thurmann, Wilhelm. Apparatus and method of forwarding sheet from paper or similar material. 4,015,838, Cl. 270-61.00F.
Thylefors, Henric Wilhelm, to Alfa-Laval AB. Centrifuge for separating solids from liquids. 4,015,773, Cl. 233-20.00A.
Tibell, Bengt Gunnar Julius: *See*—
Jonsson, Arne Ingvar; Malmstrom, Olov Valdemar; and Tibell, Bengt Gunnar Julius, 4,015,614.
Tichelaar, Gerrit Willem: *See*—
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Tichy, Dieter: *See*—
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Tichy, Jan: *See*—
Calderara, Reto; Baumgartner, Hans U.; Tichy, Jan; and Sonderegger, Hans C., 4,016,437.
Tilley, James N., to Upjohn Company, The. Preparation of polyamide from oligomeric poly-N-carboxylic anhydride. 4,016,144, Cl. 260-78.00R.
Tillie, Etienne Lucien, to Tramex S.A. Prefabricated structural elements for partitions and walls of buildings and partitions and walls consisting of such elements. 4,015,387, Cl. 52-309.170.
Tillson, Stephen A.: *See*—
Pharriss, Bruce B.; Erickson, Ross R.; and Tillson, Stephen A., 4,016,270.
Timoshenko, Evgeny Mikhailovich: *See*—
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.
Tinkham, Sherman L. Air boat. 4,015,555, Cl. 115-1.00C.
Tinnel, Robert. Water bed. 4,015,299, Cl. 5-370.000.
Tisell, Claes-Gustav Erik Yngve; Lundell, Karl Erik Bjorn; Horner, Sven Henry Nilsson; Thorstensson, Gustav Yngve; and Karlstedt, Gustav Sven Erik, to Forenade Fabriksverken. Vehicle seat safety harness. 4,015,860, Cl. 280-747.000.
Toa Nenryo Kogyo Kabushiki Kaisha: *See*—
Nishikawa, Eiichiroh; Itoh, Takuji; and Kamiyama, Setsuo, 4,016,241.
Tobin, Albert G., to Grumman Aerospace Corporation. Closed-cell ceramic foam material. 4,016,229, Cl. 264-63.000.
Toda, Toshimasa: *See*—
Murayama, Keisuke; Morimura, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohta, Noriyuki; and Osawa, Hisayou, 4,016,168.
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Tokico Ltd.: *See*—
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Tokumitsu, Ichiro: *See*—
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Tokumoto, Shin-Ichi; Tanaka, Eiji; Ogisu, Kenji; and Kawai, Hiroji, to Sony Corporation. Electrodeposition process. 4,016,052, Cl. 204-64.00T.
Tokyo Broadcasting System Inc.: *See*—
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Tokyo Gas Company Limited: *See*—
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Tolan, John R.: *See*—
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Tomalia, Donald A.; Thill, Bruce P.; and Regulski, Thomas W., to Dow Chemical Company, The. Unsaturated acrylic acid-oxazoline reaction products. 4,016,192, Cl. 260-471.00A.
Tompkins, Leo L., to Xenco Ltd. Temperature control system utilizing naturally occurring energy sources. 4,015,962, Cl. 62-2.000.
Tomy Kogyo Co., Inc.: *See*—
Ogasawara, Toyotsugu, 4,015,346.
Tonecraft Limited: *See*—
Baggaley, Jon Clemens, 4,015,885.
Topper, George William. Pipe mating tool. 4,015,323, Cl. 29-237.000.
Toro Company, The: *See*—
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Torrillo, Domenick T.: *See*—
Maieli, Joseph R.; Rosenthal, Gordon; and Torrillo, Domenick T., 4,015,787.
Toy, Henry; Bernstein, Phillip; and Van der Zwaan, Johan C., to United States of America, Navy. Ejection system. 4,015,507, Cl. 89-1.50F.
Toyama Chemical Co., Ltd.: *See*—
Karasaki, Tadashi; Hayashi, Chikako; and Furuichi, Etsuko, 4,016,260.
Toyo Boseki Kabushiki Kaisha: *See*—
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Kobayashi, Ikuya; Arai, Hiroshi; Ohta, Jun; and Izawa, Minoru, 4,016,534.
Traina, Richard, to Alison Control Inc. Ultraviolet radiation detector. 4,016,424, Cl. 250-372.000.
Tramex S.A.: *See*—
Tillie, Etienne Lucien, 4,015,387.
Travis, James; and Pannell, Ralph, to Research Corporation. Selective removal of albumin from blood fluid and compositions therefore. 4,016,149, Cl. 260-122.000.
Trecker, David John; Borden, George Wayne; and Smith, Oliver Wendell, to Union Carbide Corporation. Method for curing ink and coating compositions of acrylated epoxidized soybean oil amine compounds. 4,016,059, Cl. 204-161.000.
Treder, Charles F., to Singer Company, The. Thermostatic expansion valve capsule. 4,015,777, Cl. 236-92.00B.
Treleven, Robert E., to TEC Systems, Inc. Ultraviolet drying apparatus. 4,015,340, Cl. 34-4.000.
Triple E Corporation: *See*—
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Trump, Robert P.: *See*—
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Tsuda, Masatoshi. Copper-base solder. 4,015,948, Cl. 75-157.500.

Tsukamoto, Masahide; Ohtsuka, Tetsuro; Morimoto, Kazuhisa; and Murakami, Yoshinobu, to Matsushita Electric Industrial Co., Ltd. Electro-optical device. 4,016,094, Cl. 252-299.000.
Tsukumo, Zenzaburo, to NTN Toyo Bearing Company Ltd. Bobbin hanger. 4,015,797, Cl. 242-130.200.
Tsunoda, Kozo; Sowa, Tsuneo; and Sako, Kiyohide, to Asahi Kasei Kogyo Kabushiki Kaisha. 2,3-O-sulfinyl-cytidine-5-phosphate. 4,016,352, Cl. 536-29.000.
Tsuruki, Junzo: *See—*
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Turin, Michel J.; Raynaud, Guy M.; Pourrias, Bernard M.; and Guerret, Patrick G., to Delalande S.A. Novel derivative of N-(3,4,5-trimethoxy cinnamoyl) piperazine, its acid addition salts, its process of preparation and its therapeutic application. 4,016,154, Cl. 260-240.00J.
Twin Disc, Incorporated: *See—*
Akeson, Richard C.; and Hockenbury, Robert W., 4,015,488.
Tyrrel, Sylvan F. Signal converter. 4,016,555, Cl. 340-347.0DA.
Ubel, Helmut: *See—*
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Uchiyama, Takashi; Mashimo, Yukio; and Nakamura, Zenzo, to Canon Kabushiki Kaisha. Exposure control system for flash photography. 4,016,575, Cl. 354-33.000.
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Union Products, Incorporated: *See—*
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United Kingdom of Great Britain and Northern Ireland, Secretary of State for Environment in Her Britannic Majesty's Government of the: *See—*
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U.S. Cap & Closure, Inc.: *See—*
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Biggs, Lester G., 4,015,710.
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B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977	B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976	B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976	B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 66,272	4,014,978	Feb. 24, 1976	Mar. 29, 1977	B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977	B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977	B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976	B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976	B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976	B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977	B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977	B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 141,968	4,013,442	Mar. 30, 1976	Mar. 22, 1977	B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976	B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976	B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976	B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976	B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977	B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977	B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976	B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976	B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976	B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976	B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976	B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977	B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977	B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976	B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976	B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976	B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976	B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977	B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976	B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977	B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976	B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977	B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976	B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977	B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976	B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976	B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976	B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976	B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976	B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976	B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977	B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977	B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976	B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 328,065	4,014,752	Mar. 30, 1976	Mar. 29, 1977	B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 328,077	4,014,860	Apr. 13, 1976	Mar. 29, 1977	B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977	B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977	B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976	B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977	B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976	B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977	B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977	B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977	B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976	B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977	B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977	B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976	B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977	B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976	B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977	B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976	B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976	B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976	B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977	B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977	B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976	B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976	B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 356,470	4,014,789	Mar. 23, 1976	Mar. 29, 1977	B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977	B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976	B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976	B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977	B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976	B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977	B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977	B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976	B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977	B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976	B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976	B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976	B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977	B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977	B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976	B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977	B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977	B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976	B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977	B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977	B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976	B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976	B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977	B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976	B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977	B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976	B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976	B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976	B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977	B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976	B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976	B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977	B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977	B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976	B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976	B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977	B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976	B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976	B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976	B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976	B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976	B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976	B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976	B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977	B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977	B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976	B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976	B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977	B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976	B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976	B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977	B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976	B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976	B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976	B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976	B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977	B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976	B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976	B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976	B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976	B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976	B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977	B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976	B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976	B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976	B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976	B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977	B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976	B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976	B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977	B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976	B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976	B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976	B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976	B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976	B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977	B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976	B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976	B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977	B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977	B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976	B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976	B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976	B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977	B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977	B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977	B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976	B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976	B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977	B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977	B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977	B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976	B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977	B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976	B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976	B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977	B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977	B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977	B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976	B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976	B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976	B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976	B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977	B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977	B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976

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DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jar. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976	B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 5TH DAY OF APRIL, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Atlantic Richfield Company: *See—*
Dieter, Jerry A.; and Strand, Robert C., T957,004.

Ballard, Denis George Harold; and Jones, Eric, to Imperial Chemical Industries Limited. Separation of diluent from polymerization reaction mixture. T957,010, 4-5-77, Cl. 526-130.000.

Chitwood, James L. Dyeing process. T957,001, 4-5-77, Cl. 8-2.000.

Continental Oil Company: *See—*
Freshour, Kenneth D., T957,003.

Dieter, Jerry A.; and Strand, Robert C., to Atlantic Richfield Company. Electrophoretic deposition of styrene-maleic anhydride copolymers. T957,004, 4-5-77, Cl. 204-181.000.

Freshour, Kenneth D., to Continental Oil Company. Method of cleaning PVC reactors. T957,003, 4-5-77, Cl. 134-4.000.

Gorman, John E. Block copolymer particle forming process. T957,005, 4-5-77, Cl. 264-140.000.

Hunt, William Edward: *See—*
Reid, Michael Gerald; and Hunt, William Edward, T957,006.

Imperial Chemical Industries Limited: *See—*
Ballard, Denis George Harold; and Jones, Eric, T957,010.

International Business Machines Corporation: *See—*
Jordan, Paul V.; and Sechler, Robert F., T957,007.

Jahn, Robert G. Non-blocking oxygen-resistant vinylidene chloride polymer coating compositions. T957,009, 4-5-77, Cl. 428-327.000.

Jones, Eric: *See—*
Ballard, Denis George Harold; and Jones, Eric, T957,010.

Jordan, Paul V.; and Sechler, Robert F., to International Business Machines Corporation. Voltage-mode logic circuitry with improved input/output characteristics. T957,007, 4-5-77, Cl. 307-213.000.

Meyer, James W. Photographic image transfer element and process. T957,002, 4-5-77, Cl. 96-29.00D.

RCA Corporation: *See—*
Sheng, Abel Ching Nam, T957,008.

Reid, Michael Gerald; and Hunt, William Edward. Original document rearrangement apparatus for use in recirculating feeders. T957,006, 4-5-77, Cl. 271-3.100.

Sechler, Robert F.: *See—*
Jordan, Paul V.; and Sechler, Robert F., T957,007.

Sheng, Abel Ching Nam, to RCA Corporation. Switching circuit with accurate current threshold. T957,008, 4-5-77, Cl. 307-252.00N.

Strand, Robert C.: *See—*
Dieter, Jerry A.; and Strand, Robert C., T957,004.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 5TH DAY OF APRIL, 1977

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Akzona Incorporated: *See—*
Schuurs, Antonius Hermanus Wilhelmus Maria; and van Weemen, Bauke Klaas, Re. 29,169.

Berry, C. Raymond: *See—*
Dye, Richard A.; and Berry, C. Raymond, Re. 29,173.

Burke, Roger E., to Union Camp Corporation. Coating composition and novel complexer therefor. Re. 29,170, Cl. 260-404.500.

DeLucia, Victor E., to Torr Laboratories, Inc. Pressurized relay assembly. Re. 29,174, Cl. 335-151.000.

Dye, Richard A.; and Berry, C. Raymond, to Santa Barbara Research Center. Laser transmitter system. Re. 29,173, Cl. 331-94.5PE.

Eastman Kodak Company: *See—*
Heseltine, Donald W.; Jenkins, Philip W.; and Mee, John D., Re. 29,168.

Heseltine, Donald W.; Jenkins, Philip W.; and Mee, John D., to Eastman Kodak Company. Photographic elements with light absorbing layers. Re. 29,168, Cl. 96-84.00R.

Hughes Aicraft Company: *See—*
Lutz, Michael A., Re. 29,172.

Jenkins, Philip W.: *See—*
Heseltine, Donald W.; Jenkins, Philip W.; and Mee, John D., Re. 29,168.

Lloyd, Samuel Harry, III, to Santa Fe International Corporation. Twin hull variable draft drilling vessel. Re. 29,167, Cl. 114-264.000.

Lutz, Michael A., to Hughes Aicraft Company. Voltage-dividing DC circuit breaker and method. Re. 29,172, Cl. 361-3.000.

Mee, John D.: *See—*
Heseltine, Donald W.; Jenkins, Philip W.; and Mee, John D., Re. 29,168.

Sansui Electric Co., Ltd.: *See—*
Takahashi, Susumu, Re. 29,171.

Santa Barbara Research Center: *See—*
Dye, Richard A.; and Berry, C. Raymond, Re. 29,173.

Santa Fe International Corporation: *See—*
Lloyd, Samuel Harry, III, Re. 29,167.

Schuurs, Antonius Hermanus Wilhelmus Maria; and van Weemen, Bauke Klaas, to Akzona Incorporated. Process for the demonstration and determination of reaction components having specific binding affinity for each other. Re. 29,169, Cl. 195-103.50A.

Takahashi, Susumu, to Sansui Electric Co., Ltd. Multi-directional sound system. Re. 29,171, Cl. 179-100.4ST.

Torr Laboratories, Inc.: *See—*
DeLucia, Victor E., Re. 29,174.

Union Camp Corporation: *See—*
Burke, Roger E., Re. 29,170.

van Weemen, Bauke Klaas: *See—*
Schuurs, Antonius Hermanus Wilhelmus Maria; and van Weemen, Bauke Klaas, Re. 29,169.

LIST OF PLANT PATENTEES

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Guldemond, Cornelius K., deceased (by Guldemond, Myrta M., legal representative), to Myrta M. Guldemond. Gladanthera guldemondmyrta. 4,032, 4-5-77, Cl. 85.000.

Guldemond, Cornelius K., deceased (by Guldemond, Myrta M., legal representative), to Guldemond, Myrta M. Gladanthera guldemondcornelius. 4,033, 4-5-77, Cl. 85.000.

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Guldemond, Myrta M., legal representative: *See—*
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Guldemond, Cornelius K., deceased, 4,033.

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Obayashi, Hideo, to Cerro Gordo, Inc. *Dracaena colorama*. 4,035, 4-5-77, Cl. 88.000.

Paolino, Marie-Louis, (widow of Francis Meilland). Rose plant — Meirodium variety. 4,037, 4-5-77, Cl. 20.000.

Williams, Ernest D. Rose plant. 4,036, 4-5-77, Cl. 7.000.

Zwemstra, Jelle J. Rose plant—lifirane variety. 4,034, 4-5-77, Cl. 19.000.

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Aladdin Industries, Incorporated: *See—*
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Carter, Roland P., to Lane Company, Inc., The. Armoire. 243,902, 4-5-77, Cl. D6-164.000.

Carter, Roland P., to Lane Company, Inc., The. Buffet. 243,903, 4-5-77, Cl. D6-164.000.

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Creamer, Joan Klatil, to General Electric Company. Wall plate. 243,923, 4-5-77, Cl. D8-351.000.

Creamer, Joan Klatil, to General Electric Company. Wall plate. 243,924, 4-5-77, Cl. D8-351.000.

Creamer, Joan Klatil, to General Electric Company. Wall plate. 243,925, 4-5-77, Cl. D8-351.000.

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Creamer, Joan Klatil, 243,923.
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Grieb, Joan, to General Electric Company. Wall plate. 243,919, 4-5-77, Cl. D8-350.000.

Grieb, Joan, to General Electric Company. Wall plate. 243,922, 4-5-77, Cl. D8-351.000.

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LIST OF DESIGN PATENTEES

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115 4,016,044

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770 4,015,705
780 4,015,706

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4,016,384
153 L 4,016,385
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277 4,016,401
303 4,016,387
314 4,016,388

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248 4,016,046

CLASS 203

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49 4,016,048
60 4,016,049

CLASS 204

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64 T 4,016,052
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161 4,016,059
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192 F 4,016,061
195 R 4,016,063
256 4,016,064
275 4,016,065

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96 R 4,016,079
284 4,016,080
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4,016,082
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6 D 4,015,722
6 P 4,015,723
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457.5 4,015,758
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CLASS 226

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CLASS 227

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CLASS 228

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CLASS 229

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16 R 4,015,767
17 R 4,015,768
44 CB 4,015,769
51 C 4,015,770
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20 A 4,015,772
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153 AM 4,016,409
156 4,016,410
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CLASS 313

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61 R 4,016,490
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15 4,016,494

CLASS 328

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233 4,016,499

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124 D 4,016,503
207 P 4,016,460

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325 4,016,526

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217 S 4,015,891

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CLASS 353

27 R 4,015,900

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	25	243,892		188	243,907			243,921	D11—	70	243,934		52	243,944			243,963
	63	243,893		190	243,908			243,922			243,935		131	243,972	D30—	1	243,964
	66	243,894		197	243,909			243,923		149	243,937		138	243,960	D34—	4 R	243,965
		243,895	D7—	6	243,910			243,924		160	243,938		199	243,946			243,966
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	130	243,897		23	243,912		364	243,926		60	243,940		31	243,949		5 SS	243,967
	131	243,898		76	243,913			243,927		145	243,942		65	243,951		15 HH	243,969
	133	243,899			243,914			243,929		146	243,941	D19—	38	243,952	D47—	6 E	243,970
	158	243,900		129	243,915	D9—	86	243,928		158	243,943		64	243,950	D48—	2	243,971
	160	243,901		137	243,916	11—	81	243,936	D14—	43	243,956	D22—	30	243,954	D64—	11 B	243,957
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CLASSIFICATION OF PLANTS

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DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

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Florida	12	Nevada	32	Virgin Islands	52
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Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 : 4,015,791	4,015,748	4,016,428	4,016,436	4,015,481	4,016,522
4,016,199	4,015,759	4,016,432	4,016,448	4,015,496	4,016,523
4 : 4,015,297	4,015,769	4,016,450	4,016,467	4,015,505	4,016,532
4,015,323	4,015,798	4,016,463	4,016,472	4,015,523	4,016,549
4,015,405	4,015,799	4,016,470	4,016,514	4,015,525	18 : 4,015,333
4,015,868	4,015,802	4,016,481	10 : 4,015,451	4,015,544	4,015,462
4,015,880	4,015,813	4,016,483	4,015,479	4,015,549	4,015,542
4,016,507	4,015,819	4,016,492	4,015,998	4,015,579	4,015,607
4,016,546	4,015,827	4,016,504	4,016,125	4,015,591	4,015,725
6 : Re.29,167	4,015,839	4,016,512	4,016,349	4,015,600	4,015,734
Re.29,172	4,015,850	4,016,515	4,016,447	4,015,605	4,015,848
Re.29,173	4,015,852	4,016,516	11 : 4,016,314	4,015,619	4,015,866
Re.29,174	4,015,862	4,016,536	12 : 4,015,353	4,015,620	4,015,879
4,015,299	4,015,873	4,016,537	4,015,527	4,015,643	4,015,973
4,015,304	4,015,887	4,016,540	4,015,538	4,015,660	4,016,140
4,015,312	4,015,899	4,016,547	4,015,555	4,015,669	4,016,224
4,015,318	4,015,928	4,016,551	4,015,613	4,015,681	4,016,320
4,015,336	4,015,930	4,016,552	4,015,616	4,015,728	4,016,464
4,015,337	4,015,939	4,016,563	4,015,810	4,015,756	4,016,465
4,015,343	4,015,951	4,016,564	4,015,821	4,015,784	4,016,489
4,015,351	4,015,957	4,016,583	4,015,857	4,015,789	19 : 4,015,298
4,015,358	4,015,977	4,016,595	4,015,888	4,015,824	4,015,729
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4,015,490	4,016,063	4,016,086	4,016,545	4,015,908	4,015,520
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4,015,507	4,016,078	4,016,498	4,016,577	4,015,931	4,015,668
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4,015,554	4,016,185	4,015,467	4,015,453	4,016,068	4,016,251
4,015,558	4,016,204	4,015,494	4,015,550	4,016,081	4,016,344
4,015,574	4,016,208	4,015,548	4,015,722	4,016,234	21 : 4,015,369
4,015,578	4,016,223	4,015,717	4,016,019	4,016,237	4,015,442
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4,015,593	4,016,239	4,015,775	4,016,259	4,016,290	4,016,322
4,015,598	4,016,266	4,015,801	4,016,318	4,016,294	22 : 4,015,435
4,015,601	4,016,270	4,015,965	15 : 4,015,795	4,016,298	4,015,552
4,015,621	4,016,275	4,016,010	16 : 4,015,470	4,016,333	4,015,628
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DESIGN PATENTS

1	:	243,964			243,955	25	:	243,951		243,898			243,973			243,923
6	:	243,915	12	:	243,969	26	:	243,913		243,900	37	:	243,893			243,924
		243,926			243,974			243,946		243,907			243,895			243,925
		243,927	13	:	243,963			243,953		243,917	39	:	243,941	47	:	243,943
		243,928	17	:	243,891			243,954		243,919			243,966	48	:	243,930
		243,929			243,905			243,956		243,920	41	:	243,940	51	:	243,901
		243,931			243,906			243,959		243,922	42	:	243,910			243,902
		243,932														
		243,933	18	:	243,960	27	:	243,911		243,934			243,937			243,903
		243,947	20	:	243,939	34	:	243,899		243,935			243,968			243,904
		243,952			243,948			243,971		243,949	44	:	243,918			243,945
9	:	243,916	24	:	243,938	36	:	243,892		243,972			243,921			243,965

PLANT PATENTS

26	:	4,032			4,033	48	:	4,036								

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

17	:	T957,004	26	:	T957,009	36	:	T957,002			T957,007					
			34	:	T957,008			T957,006	40	:	T957,003	47	:	T957,001	48	:	T957,005

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary

PATENT AND TRADEMARK OFFICE
[illegible] Commissioner